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ABSTRACT

The National Science Foundation, in attempting to monitor the health of United States science and technology, assembles and analyzes comprehensive measures of the financial and human resources that government, industry, academia, and other nonprofit institutions devote to scientific and technological activities. This annual report presents a concise but comprehensive summary of this type of science and technical information. Areas considered related to national perspectives of research and development (R&D) resources are: the R&D effort and the national economy; R&D performance; R&D by national objective; the R&D and gross national product (GNP) ratio; basic research, applied research, and development; and international comparisons. Areas considered related to science and engineering (SE) personnel are: employment trends; SE labor market balance; sectoral patterns and trends; doctoral scientists and engineers; women and minorities; and the SE pipeline. Included are 21 charts, 87 detailed statistical tables, and a summary of major findings (including those indicating that business and industry is the largest employer of both scientists and engineers, that women and minorities continue to be underrepresented in SE, and that the four major economic sectors spent an estimated $88 billion on R&D activities in 1983). (JN)

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foreword

This Nation's ability to compete in international economic markets and to maintain a strong national security program is largely dependent on its ability to invest its financial and human resources wisely. This is especially true of its investment in areas of science and technology. The resources utilized in these areas have provided a large part of the impetus to recent capital and labor productivity increases as well as to the decreases in the inflation rate. Each sector of the economy—government, industry, academia, and other nonprofit institutions—plays a vital role in this endeavor. The National Science Foundation, in attempting to monitor the health of U.S. science and technology, assembles and analyzes comprehensive measures of the financial and human resources that each of these sectors devotes to scientific and technological activities. This annual report presents a concise but comprehensive summary of this type of information.

This publication complements the National Science Board's *Science Indicators* and *Science and Engineering Personnel: A National Overview* developed by this Division. The 1984 data presented in this current report reflect estimates for research and development (R&D) programs contained in the Federal 1985 budget.

The Division of Science Resources Studies, responsible for the generation of this and other reports, continues to seek suggestions for their improvement from the user community. Comments on possible improvements will be greatly appreciated and will help in the development of future reports.

Charles E. Falk
Director, Division of Science
Resources Studies
Directorate for Scientific,
Technological, and
International Affairs

February 1984

acknowledgments

This report was prepared by John Chirichiello, Senior Staff Associate for Intersectoral Affairs, and Michael Crowley, Senior Staff Associate, Scientific and Technical Personnel Studies Section.

Supervision, review, and guidance were provided by Alan Fechter, Head, Scientific and Technical Personnel Studies Section; William L. Stewart, Head, R&D Economic Studies Section; and Charles E. Falk, Director, Division of Science Resources Studies.

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summary

r&d resources

In 1984 the Nation is expected to invest $97.0 billion in research and development, 11 percent more than in 1983 (6 percent in real terms) (chart 1). Federal Government and industry sources are expected to show the largest growth (in absolute terms) in research and development (R&D) funding in 1984.

Within only six years, funding for research and development performed within the United States more than doubled from $35 billion in 1975 to $72 billion in 1981. When adjusted for inflation, however, the increase between the two years was less than one-third. In the first five years of this period, the primary R&D emphasis by both Federal and non-Federal sources was on nondefense areas such as energy and pollution abatement. In 1981 Federal R&D support began to shift toward defense. Industry R&D expenditures on energy and pollution abatement increased during 1981 at only one-third the rate of the previous five years. Also there is limited evidence that the Economic Recovery Tax Act of 1981 (ERTA) began to have a positive influence on R&D spending across a number of industries during that year. The ERTA offers U.S. companies an incentive to increase domestic R&D spending by providing a 25-percent tax credit for incremental R&D expenditures made between July 1, 1981 and December 31, 1985.

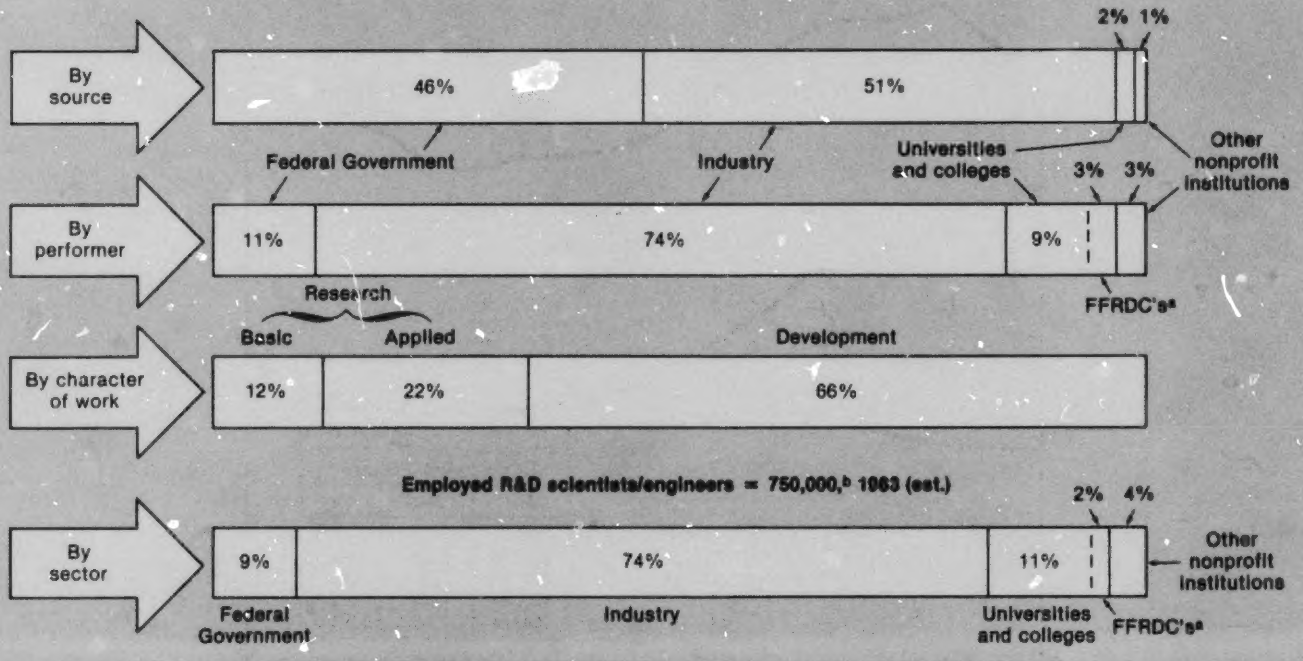

Chart 1. The national R&D effort

Expenditures for research and development = $97.0 billion 1984 (est.)

[a] Federally funded research and development centers administered by universities and colleges.

[b] Full-time equivalents.

SOURCE: National Science Foundation; appendix tables 5, 6, 7, 9, 11, and 14

National R&D spending in 1982 increased an estimated 12 percent over 1981 to $80.3 billion. In constant dollars the gain was an estimated 5 percent. In 1983 national R&D spending increased an additional 9 percent to $87.7 billion, or 5 percent in constant dollars.[1]

The proportion of the gross national product (GNP) spent on R&D activities has been increasing each year since 1978 from 2.2 percent to an estimated 2.7 percent in 1984 (chart 2). Over this period national R&D spending increased in real terms at an average annual rate of 5 percent compared to 2 percent for the Nation's GNP. The ratio should tend to stabilize somewhat in the near future as economic recovery continues and GNP growth (based on estimates of the Council of Economic Advisors) returns to the levels existing prior to the recession.

The United States spends more money annually on R&D activities than any other nation. Relative to the GNP, however, U.S. R&D expenditures have been comparable to those of West Germany since the early seventies, with the United Kingdom (2.1 percent) and Japan (2.0 percent) close behind. When civilian (nondefense) R&D expenditures are compared to the GNP, the U.S. ratio (1.8 percent) is lower than that of West Germany (2.2 percent) and Japan (1.9 percent).

The full-time-equivalent of 750,000 scientists and engineers is expected to be employed on R&D activities in 1983. This represents an increase of 4 percent over 1982 and nearly 50 percent over the 1972 figure, with most of the growth occurring in the industrial sector. This national growth reflected in large part greater attention being directed toward energy during the mid- to late seventies, particularly within the Federal and industrial sectors. Between 1975 and 1981 industry R&D expenditures in real terms and industrial R&D professional employment both increased at average annual rates of about 5.5 percent. Starting in 1981, the increases in the employment of R&D scientists and engineers reflected Federal emphasis on defense and space programs as well as increased demand in industry.

The Federal Government was the source of 46 percent of the national R&D total in 1982, the same share as in 1981. This 1982 total of $37.1 billion was 11 percent higher than in 1981, or 4 percent in constant dollars; a 9-percent increase is expected

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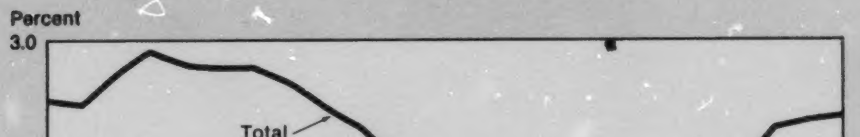
[1] In the absence of a reliable R&D cost index, the implicit price deflator for the gross national product (GNP) is used to convert R&D expenditures to constant dollars. The GNP deflator includes the effects of price changes for all goods and services in the economy and, therefore, can only indicate approximate changes in cost of inputs specifically related to R&D performance. The increase in the GNP deflator between 1982 and 1983 was 4 percent.

Chart 2. U.S. R&D/GNP



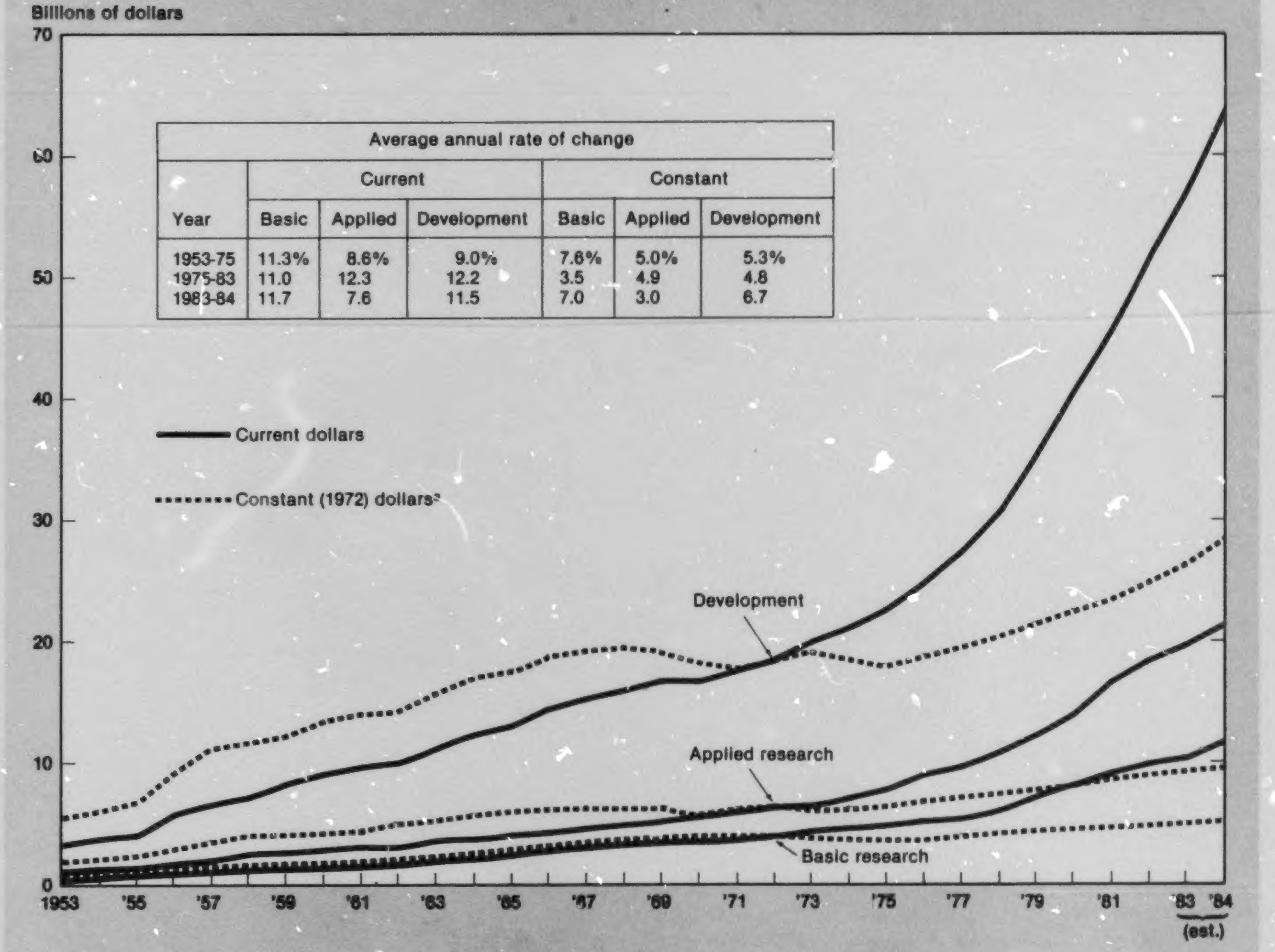
Average annual rate of change (Constant 1972 dollars)		
Year	R&D	GNP
1961-67	6.0%	5.0%
1967-75	– .5	2.5
1975-80	4.5	3.7
1980-84	5.2	2.3
1983-84	5.9	5.3

SOURCES: National Science Foundation and Department of Commerce; appendix table 15 in 1983 to $40.3 billion, or 4 percent in real terms and a 10-percent increase is expected in 1984 to $44.3 billion, or 5 percent in real terms. Defense R&D spending is expected to be primarily responsible for the growth in both years.[2]

Non-Federal R&D spending is expected to increase 9 percent in 1983 and 11 percent in 1984 to reach $52.7 billion. In real terms the 1984 increase is estimated at 7 percent.

In 1983 the national research portion of total R&D spending amounted to an estimated $30.5 billion, 8 percent above the 1982 level; national development spending amounted to $57.2 billion, 10 percent higher than in 1982. In constant dollars the increases were 3 percent and 5 percent, respectively. The lower growth rate for research resulted from smaller Federal increases in both basic and applied research. In 1984 the expected increases are 12 percent for basic research, 8 percent for applied research, and 11 percent for development (chart 3). The higher growth rate for development outlays in 1984, as well as in 1983, reflects intensified defense spending by the Federal Government.

Chart 3. National R&D spending by character of work



Average annual rate of change						
	Current			Constant		
Year	Basic	Applied	Development	Basic	Applied	Development
1953-75	11.3%	8.6%	9.0%	7.6%	5.0%	5.3%
1975-83	11.0	12.3	12.2	3.5	4.9	4.8
1983-84	11.7	7.6	11.5	7.0	3.0	6.7

[a] Based on GNP implicit price deflator.
SOURCE: National Science Foundation; appendix tables 7, 9, and 11

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[2] Office of Management and Budget, "Special Analysis K," *The Budget of the United States Government, Fiscal Year 1985* (Washington, D.C.: Supt. of Documents, U.S. Government Printing Office, 1984).

Even though the Federal Government has begun to shift emphasis toward development in recent years, especially in the defense area, it continues to support two-thirds of the Nation's basic research, a ratio which has existed since the early sixties. One-half of this support is devoted to the Nation's universities and colleges. In 1984 the Federal share of total applied research support amounted to 39 percent. This is down from 50 percent a decade earlier and reflects increased industry support over this period. Federal support of development is expected to amount to 44 percent of the national total in 1984, where it has remained since 1982, but down from the 50-percent level 10 years ago. This smaller percentage results from greater emphasis on defense activities. In both applied research and development, the bulk of Federal funds is spent in industry or intramural laboratories.

scientists and engineers

The general dampening in economic activity between 1981 and 1982 had an impact on supply and demand conditions for scientists and engineers. In 1981, there were shortages of computer specialists and engineers, but adequate supplies of environmental scientists, physical and social scientists, and psychologists. Supply and demand conditions for life and mathematical scientists were in rough balance. By 1982, shortages continued for computer specialists, but supply/demand conditions for most engineering fields had moved toward one of balance, and there were adequate supplies in most science fields. Preliminary data for 1983 suggest that the market for computer specialists is closer to balance in that year.

The weakening in demand in 1982 followed strong employment gains from the midseventies to 1981. Employment of scientists and engineers in S/E jobs expanded at a more rapid rate than (1) total U.S. employment; (2) employment of all professional and related workers; and, (3) overall economic activity. Employment in S/E jobs increased at an annual rate of 5.9 percent between 1976 and 1981. Overall economic activity, as measured by the GNP, increased at an annual rate of 3.0 percent, while total U.S. employment and that of all professional and related workers increased at annual rates of 2.9 percent and 3.0 percent, respectively. Between 1980 and 1981, the number of employees in S/E jobs accelerated, while increases in GNP and other employment variables slowed considerably. The more rapid upswing in S/E employment resulted from the concentration of scientists and engineers in high-technology industries. These industries have undergone many recent developments: (1) an acceleration in overall employment; (2) changes in the occupational mix of industrial employment; (3) efforts to increase productivity and improve the international competitiveness of U.S. industries; and, (4) rising levels of defense expenditures.

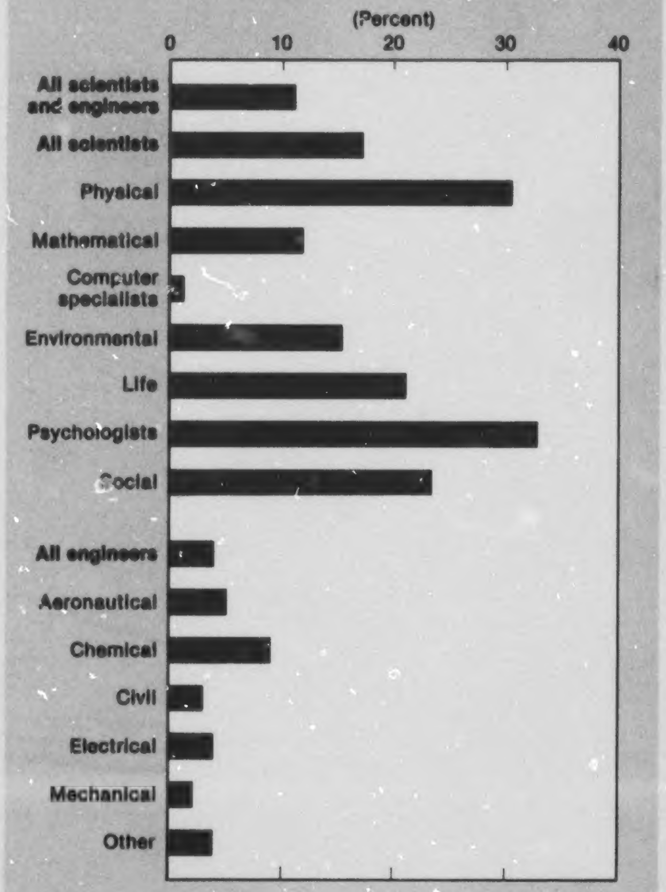
Growth in S/E employment varied by field with the number of computer specialists about doubling between 1976 and 1981. Employment of environmental and life scientists also increased at above average rates.

The most frequently reported work activity of those holding S/E jobs continued to be within research and development, including R&D management. The activities of scientists differed from those of engineers, who were more likely to cite development rather than research as their major activity. In addition, a larger proportion of engineers were involved in general management, in production, and related activities. Although the mix of work activities of scientists and engineers has changed only slightly since the midseventies, the number engaged in production and similar pursuits has increased by more than 50 percent between 1976 and 1981, mostly on the part of engineers in industry, reflecting the emphasis on improving productivity and increasing the international competitiveness of U.S. firms.

Since the midseventies, there has been an increase in the share of scientists and engineers (in both S/E and non-S/E jobs) working in business and industry, and a corresponding decline in the shares employed by educational institutions and the Federal Government.

Scientists and engineers with doctorates are a relatively stable component of the S/E work force. In 1981, about 11 percent of those employed held doctorates, about the same percentage as in 1976 (chart 4). The proportion holding doctorates varies sub-

Chart 4. Doctoral intensity of the science/engineering work force: 1981



SOURCE: National Science Foundation

stantially between engineers and scientists. Excluding computer specialists, over 20 percent of the scientists hold doctorates compared to 2 percent of the computer specialists and 4 percent of the engineers. The relatively low proportion of doctoral computer specialists and engineers reflects the acceptance of the bachelor's degree as the entry level for these fields.

Women and racial minorities continued to be underrepresented in science and engineering despite above average increases in employment (chart 5). Over the 1976-81 period, employment of women almost doubled, and the 420,000 employed women represented about 13 percent of the total (up from 9 percent in 1976). Women, however, represented over 40 percent of all employed workers and all professional and related workers. Employment increases for women scientists and engineers were paced by an over 200-percent increase in the number of computer specialists. Gains in this one field accounted for almost two-fifths of the total increase in the number of employed women scientists and engineers between 1976 and 1981.

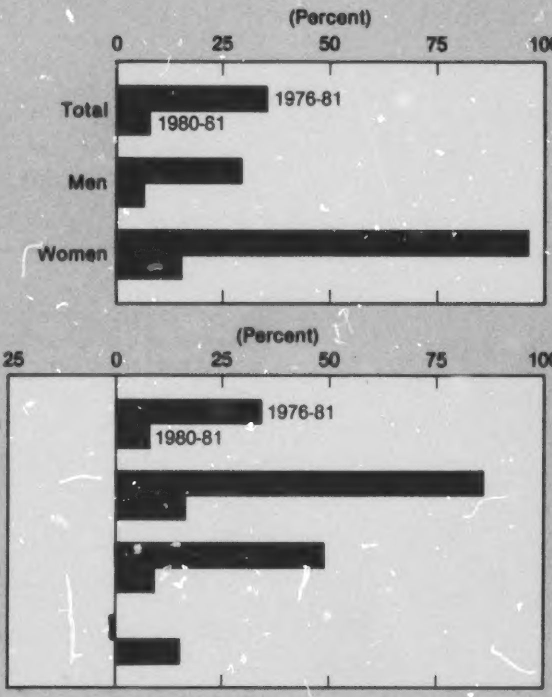
Employment of both black and Asian scientists and engineers increased more rapidly than the employment of whites between 1976 and 1981. Blacks, however, remain underrepresented in S/E activities. They constituted about 2 percent of all scientists and engineers in 1981, but over 7 percent of all professional and related workers.

Persons of Hispanic origin continued to be underrepresented in the doctoral S/E work force. About 1.4 percent (4,800) of all employed doctoral scientists and engineers were Hispanic in 1981. Hispanics, however, represented about 2.6 percent of all professional and related workers and over 5 percent of all employed workers.

Additions to the supply of scientists and engineers are significantly influenced by the annual flows of new S/E graduates into the S/E work force. An S/E career requires adequate grounding in mathematics and science; a deficiency in such background can result in significant barriers to the pursuance of such career. Scores on the Scholastic Aptitude Test (SAT) are also important because of their substantial impact on college admissions decisions. Overall, scores have been declining in the past decade. These declines, however, have not been evident among students intending to major in an S/E field.

The number of S/E degrees awarded as well as the transition of new graduates into the S/E labor market are also important components of new S/E supply. The number of S/E degrees awarded increased slightly between 1980 and 1981 at all degree levels after declining steadily in recent years. The major impetus for these increases was the rise in engineering and computer science degrees awarded at all three levels. Recent S/E graduates in all fields made successful transitions into the labor force, where most seeking work found it. A high proportion, however, especially at the bachelor's degree level, accepted non-S/E employment. The proportion employed in S/E jobs was higher at advanced-degree levels.

Chart 5. Employment growth by sex and race



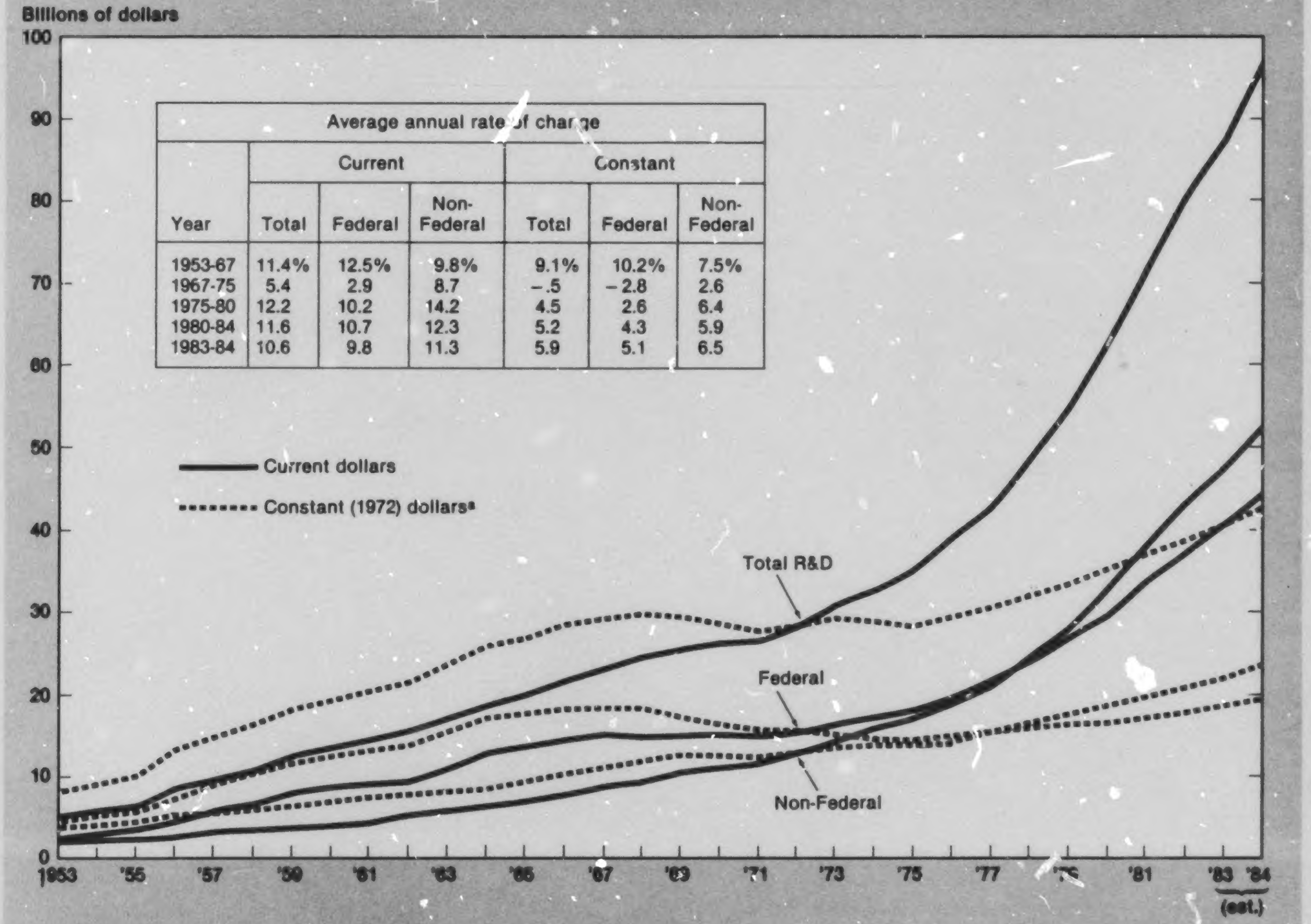
SOURCE: National Science Foundation

national perspectives of r&d resources

the r&d effort and the national economy

Four principal sectors of the economy, in terms of science and technology activity—Federal Government, industry, universities and colleges, and other nonprofit institutions—spent an estimated $88 billion on R&D activities in 1983. This was a 9-percent increase over 1982 levels, or 5 percent in constant dollars. In 1984 total R&D spending by these four sectors is expected to increase an additional 11 percent, or 6 percent in real terms, using the Office of Management and Budget (OMB) inflation estimate of 4.5 percent for that year (chart 6).

Chart 6. National R&D funding



Average annual rate of change						
	Current			Constant		
Year	Total	Federal	Non-Federal	Total	Federal	Non-Federal
1953-67	11.4%	12.5%	9.8%	9.1%	10.2%	7.5%
1967-75	5.4	2.9	8.7	−.5	−2.8	2.6
1975-80	12.2	10.2	14.2	4.5	2.6	6.4
1980-84	11.6	10.7	12.3	5.2	4.3	5.9
1983-84	10.6	9.8	11.3	5.9	5.1	6.5

[a] Based on GNP implicit price deflator.

SOURCE: National Science Foundation; appendix table 5

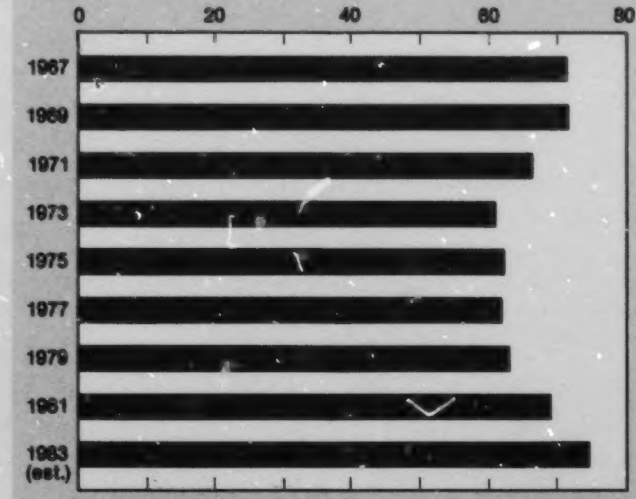
During 1982 an estimated 723,000 scientists and engineers were employed on a full-time-equivalent (FTE) basis in R&D activities. This was an increase of 5 percent over the 1981 level of 691,400. In 1983, the FTE employment of R&D professionals is expected to increase an additional 4 percent to 750,000. Since the midseventies, for every 10,000 persons in the total employed civilian labor force approximately 63 were FTE R&D scientists or engineers. Since 1979, however, continued increases in R&D funding combined with a relatively stable work force should result in an increase in this ratio to 74 through 1983 (chart 7).

Nearly a decade of virtually no real growth in R&D funding ended following the oil embargo of 1974 and the recession in early 1975. At that time the Nation's R&D effort began a period of real-term growth that was heavily influenced by the search for solutions to the energy problem. Between 1975 and 1980, national R&D expenditures increased in constant dollars at an average annual rate of 4.5 percent. Over this period, non-Federal R&D support increased at twice the rate as Federal R&D support (6 percent annually versus 3 percent). The increases in non-Federal support were concentrated in industry and resulted mainly from greater emphasis on fossil fuels and energy conservation. The Federal R&D increases, while partly the result of continuing expenditures in defense and space areas, were also the result of emphasis on energy-related fields, particularly nuclear energy development (chart 8).

The most significant event that occurred in 1981 which impacted on national R&D spending was a change in Federal Government policies toward a reorientation of the role of the Federal Government in the economy. The goal was to reduce Government participation in economic decisionmaking and to fund R&D activities to meet specific Federal needs such as defense. Another goal was to meet broad national needs in areas in which the private sector lacks incentive to invest adequately. In addition, the Economic Recovery Tax Act (ERTA) of 1981 was passed to provide additional tax credits to companies that increased their R&D expenditures. Reflecting these two events, Government R&D efforts are expected to shift toward defense through 1984 and later. At the same time, the R&D efforts of the private sector are expected to increase, considering the effects of the ERTA and the growing foreign competition in high-technology industries which produced the R&D increases during the period 1975 to 1980. These factors are expected to continue to have a positive impact on companies' own funding of R&D activities through 1984 and beyond. This growth pattern survived two recessions which were accompanied by sharp reductions in monetary expansion and continued gains in the inflation rate through late 1982.

Examining year-to-year trends in R&D spending, however, may not always be the optimal way of analyzing changes in R&D activities. Since many R&D projects are conducted over periods exceeding one year, the funding of a project in any year is dependent to some extent on the funding levels in previous years and, in turn, can have an impact on spending levels in future years. In these cases, analysis of a 3-year moving average of R&D spending may be preferable. The 3-year moving average allows analysis of the long-range trend in R&D spending without the distortation of year-to-year variations which may tend to conceal actual spending patterns.

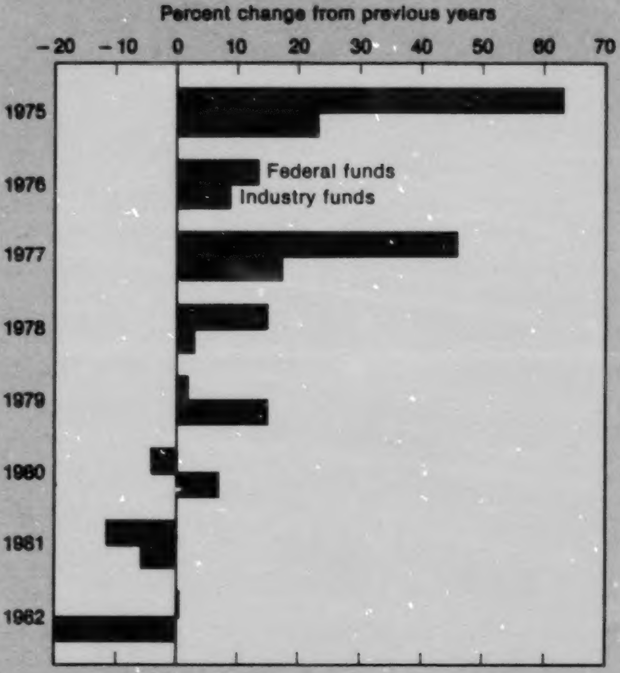
Chart 7. R&D scientists and engineers[a] per 10,000 employed civilian labor force



[a]Full-time-equivalent basis.

SOURCES: National Science Foundation and Department of Labor; appendix table 16

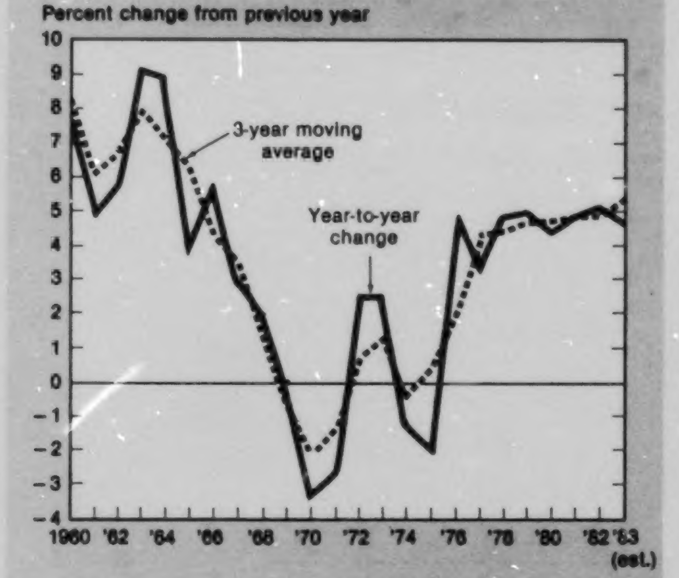
Chart 8. Changes in Federal and industry energy R&D funds (Based on 1972 constant dollars)



SOURCE: National Science Foundation; appendix tables 22 and 47.

Chart 9 shows that the trend in the 3-year moving average of national R&D expenditures is generally consistent with that of the year-to-year change. The 3-year moving average, however, does tend to smooth somewhat the annual variations in R&D spending and, as a result, implies that R&D spending is not as subject to short-term fluctuations as the year-to-year changes.

Chart 9. Annual percent change in national R&D spending (Based on 1972 constant dollars)



SOURCE: National Science Foundation; appendix table 8

r&d performance

Industrial R&D performance accounts for 70 percent of the national effort. This historical pattern will probably continue in both 1983 and 1984 as industry is again expected to account for approximately 70 percent of the national R&D total. In 1984, this sector is expected to expend $72.0 billion, an increase of 11 percent over the 1983 level of $64.6 billion, or 7 percent in real terms. (See table.) Both company R&D funds and Federal funds for research and development performed by industry are expected to increase at about the same rate between the two years.

Between 1975 and 1981, company R&D funding increased at nearly twice the constant-dollar rate as Federal R&D funds to industry (6.6 percent annually versus 3.5 percent). The higher rate of expenditure of company funds reflected in part the national emphasis on energy conservation and development. In addition, Federal policies concerning regulations and minimum standards also affect industry's R&D spending levels, particularly in areas such as food and drug production, environmental pollution, and public safety. For example, industry reported spending $700 million of company funds in 1979 on R&D projects undertaken to meet existing government regulations. By 1981 this total had risen to $2.5 billion.

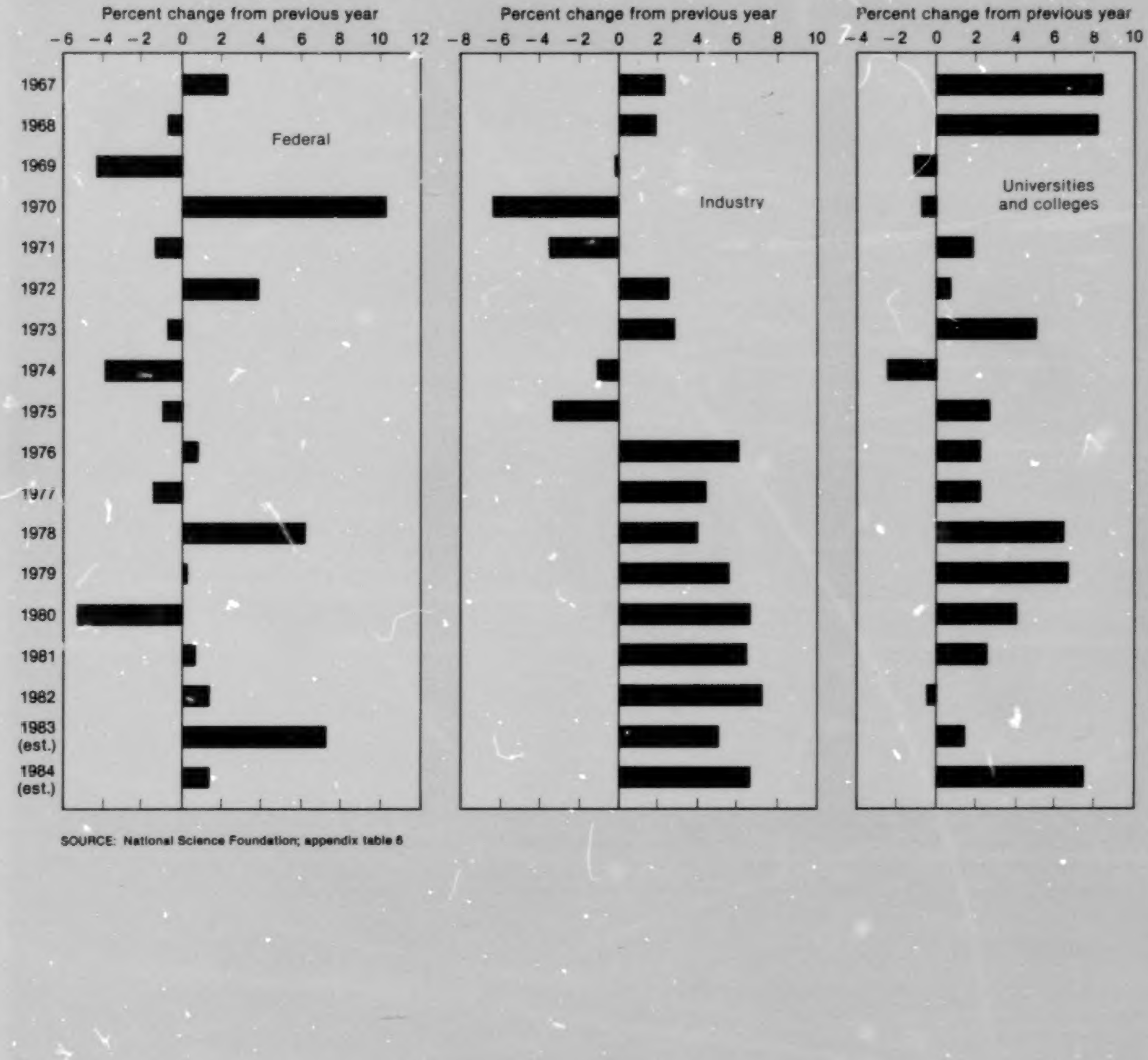
The Federal Government provided nearly one-half the money spent by industry for R&D performance during the late sixties. By the midseventies, the Federal share decreased to about 35 percent of the total, mainly as a result of cutbacks in defense and space programs as well as continued growth in industry R&D funding. By 1980, the Federal share of industry R&D funding, while continuing to decrease, did so at a much slower rate; in that year the Federal share amounted to 32 percent. This slower rate of decrease reflected increased Federal emphasis on energy R&D programs during the later part of the seventies. Starting in 1981 and continuing through 1984, however, the emphasis on Federal defense and space programs is expected to keep the Federal R&D share at about 32 percent.

Historically the second-largest R&D performer in the Nation, the Federal Government is expected in 1984 to account for approximately 11 percent of the national total, or $10.8 billion. This represents an increase of 6 percent over 1983 in current dollars and 1 percent in constant dollars (chart 10). Since the early seventies Federal intramural R&D performance in real terms has remained relatively constant, as Federal R&D performance decreased from 16 percent of the national total to an estimated 11 percent in 1984. This leveling in Federal R&D intramural performance results in large part from cutbacks in space R&D programs. Between 1970 and 1982, for example, intramural R&D performance of the National Aeronautics and Space Administration (NASA) decreased in real terms by nearly one-half.

Universities and colleges account for an additional 9 percent of the national R&D effort. In 1984, R&D performance in this sector is expected to reach $8.6 billion, a 12-percent increase over 1983, or 7 percent when adjusted for inflation. Between 1974 and 1981, university and college R&D performance increased by 30 percent in constant dollars and remained level for the next two years. This levelling reflected cutbacks in Federal funding, particularly in the health area, as well as general cutbacks in State and local funding of universities and colleges. Agencies of the Federal Government fund about two-thirds of academic R&D expenditures.

Between 1974 and 1981, university- and college-associated federally funded research and development centers (FFRDC's) increased their R&D performance by nearly two-thirds in constant dollars. The increase over this period reflected the Federal emphasis on energy programs. Between 1981 and 1984, the shift in Federal emphasis from energy to defense is expected to result in a cutback in Federal R&D funding to these centers of around 4 percent in real terms.

Chart 10. National R&D spending by performer (Based on constant 1972 dollars)



SOURCE: National Science Foundation; appendix table 6

Intersectoral transfers of funds used for performance of research and development, basic research, applied research, and development: 1984 (estimated)

RESEARCH AND DEVELOPMENT[1]

[Dollars in millions]

Sources of funds	Performers: Federal Government	Performers: Industry[2]	Performers: Universities and colleges[3]	Performers: Associated FFRDC's[4]	Performers: Other nonprofit institutions[2]	Total	Percent distribution, sources
Federal Government	10,800	23,350	5,500	2,770	1,850	44,270	45.7
Industry	— —	48,650[5]	425	— —	300	49,375	50.9
Universities and colleges	— —	— —	2,080[6]	— —	— —	2,080	2.1
Other nonprofit institutions	— —	— —	600	— —	650[6]	1,250	1.3
Total	10,800	72,000	8,605	2,770	2,800	96,975	100.0
			11,375				
Percent distribution, performers	11.1	74.2	8.9	2.9	2.9	100.0	100.0
			11.8				

BASIC RESEARCH[1]

[Dollars in millions]

Sources of funds	Performers: Federal Government	Performers: Industry[2]	Performers: Universities and colleges[3]	Performers: Associated FFRDC's[4]	Performers: Other nonprofit institutions[2]	Total	Percent distribution, sources
Federal Government	1,800	425	4,030	975	545	7,775	65.6
Industry	— —	1,875[5]	260	— —	135	2,270	19.2
Universities and colleges	— —	— —	1,220[6]	— —	— —	1,220	10.3
Other nonprofit institutions	— —	— —	340	— —	245[6]	585	4.9
Total	1,800	2,300	5,850	975	925	11,850	100.0
			6,825				
Percent distribution, performers	15.2	19.4	49.4	8.2	7.8	100.0	100.0
			57.6				

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[1] All data are estimated from reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of their respective sectors. They are estimated to account for less than 5 percent and 15 percent, respectively, of the industry and nonprofit institutions performance totals. FFRDC's are organizations exclusively or substantially financed by the Federal Government to meet a particular requirement or to provide major facilities for research and training purposes.

Intersectoral transfers of funds used for performance of research and development, basic research, applied research, and development: 1984 (estimated) — Con.

APPLIED RESEARCH[1]

[Dollars in millions]

Sources of funds	Performers					Total	Percent distribution, sources
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[3]		
Federal Government	3,000	2,650	1,210	870	650	8,380	39.2
Industry	——	11,600[5]	125	——	105	11,830	55.3
Universities and colleges	——	——	720[5]	——	——	720	3.4
Other nonprofit institutions	——	——	225	——	245[5]	470	2.2
Total	3,000	14,250	2,280	870	1,000	21,400	100.0
			3,150				
Percent distribution, performers	14.0	66.6	10.7	4.1	4.7	100.0	100.0
			14.8				

DEVELOPMENT[1]

[Dollars in millions]

Sources of funds	Performers					Total	Percent distribution, sources
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[3]		
Federal Government	6,000	20,275	260	925	655	28,115	44.1
Industry	——	35,175[5]	40	——	60	35,275	55.4
Universities and colleges	——	——	140[5]	——	——	140	.2
Other nonprofit institutions	——	——	35	——	160[5]	195	.3
Total	6,000	55,450	475	925	875	63,725	100.0
			1,400				
Percent distribution, performers	9.4	87.0	.7	1.5	1.4	100.0	100.0
			2.2				

[3] Includes agricultural experiment stations.

[4] Federally funded research and development centers (FFRDC's) administered by individual universities and colleges and by university consortia.

[5] Includes State and local government funds.

SOURCE: National Science Foundation

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research and development by national objectives

Historically, the largest R&D spending area has been defense (chart 11). In the early sixties, over one-half the total R&D national expenditure was in this area. By the early seventies, however, Federal R&D spending for defense had declined while industry funding in civilian areas increased. As a result, defense as a percent of the total R&D effort fell to less than 30 percent by the midseventies and to as low as 22 percent in 1980. Since 1980, the defense share has increased as a result of significant Federal defense R&D spending and is expected to reach 29 percent of the national total in 1984. As shown in chart 11, most of the remaining 71 percent of the national R&D effort in 1984 is expected to be for space, general science, energy, and health.

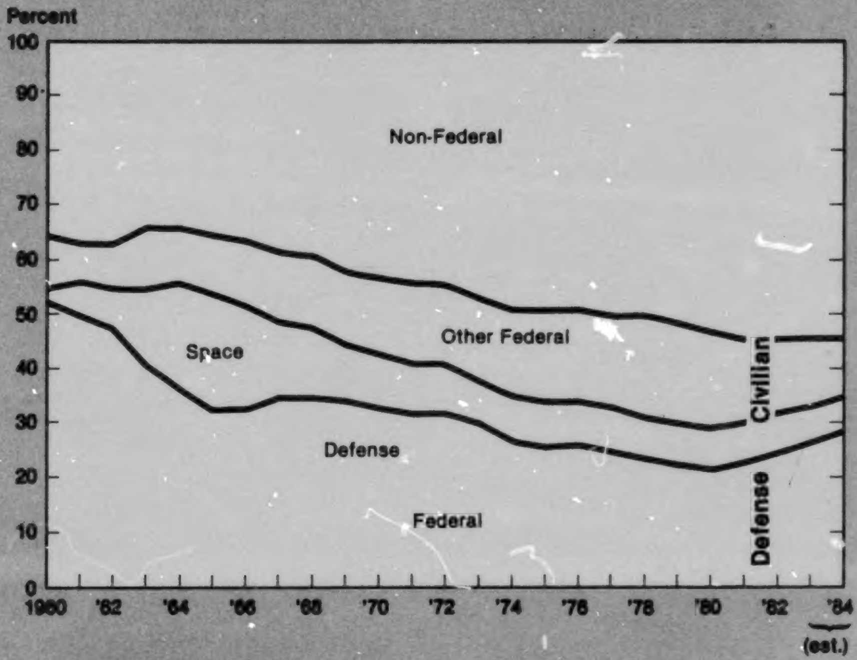
the r&d/gnp ratio

In 1984, total U.S. R&D expenditures are expected to amount to 2.7 percent of the Nation's GNP. This ratio is up slightly from 2.6 percent in 1983. After peaking at 3.0 percent during the midsixties, the ratio declined gradually to 2.3 percent by 1973 and remained close to that level through 1979. This drop reflected Federal cutbacks in defense and space R&D programs during a period when the GNP continued to increase. R&D gains in the energy area between 1975 and 1979 resulted in a stabilization of this ratio. Since 1979, the ratio has gone up from 2.3 percent to an expected level of 2.7 percent in 1983. A large part of this increase in the ratio resulted, however, less from more spending on R&D activities—which have continued to increase since 1975 in real terms at about 5 percent annually—than from a slowdown in the GNP growth. The recent recessions between 1980 and 1982 resulted in a leveling in the rate of real growth of the GNP between these years. The economic recovery which began during the early part of 1983 indicates stabilization of the ratio over the next few years.

basic research, applied research, and development

Between 1975 and 1981, national spending on basic research, applied research, and development increased at average constant-dollar rates of 4.1 percent, 5.5 percent, and 4.4 percent, respectively. Federal support of basic research over the 1975-81 period went up in real terms at a faster rate than Federal support for

Chart 11. Trends in Federal and non-Federal R&D outlays



SOURCE: National Science Foundation; appendix table 13

either applied research or development (3.9 percent annually versus 3.2 percent for applied research and 2.3 percent for development). The gains in non-Federal support were greatest in applied research (7.6 percent annually) and development (6.2 percent annually). Non-Federal support of basic research increased over this period by 4.4 percent annually. Data and estimates for 1982, 1983, and 1984 show the largest Federal constant-dollar growth in development, reflecting increased defense spending. Non-Federal support is expected to grow in all areas. R&D work to industry to avoid Federal preemption of private sector efforts.

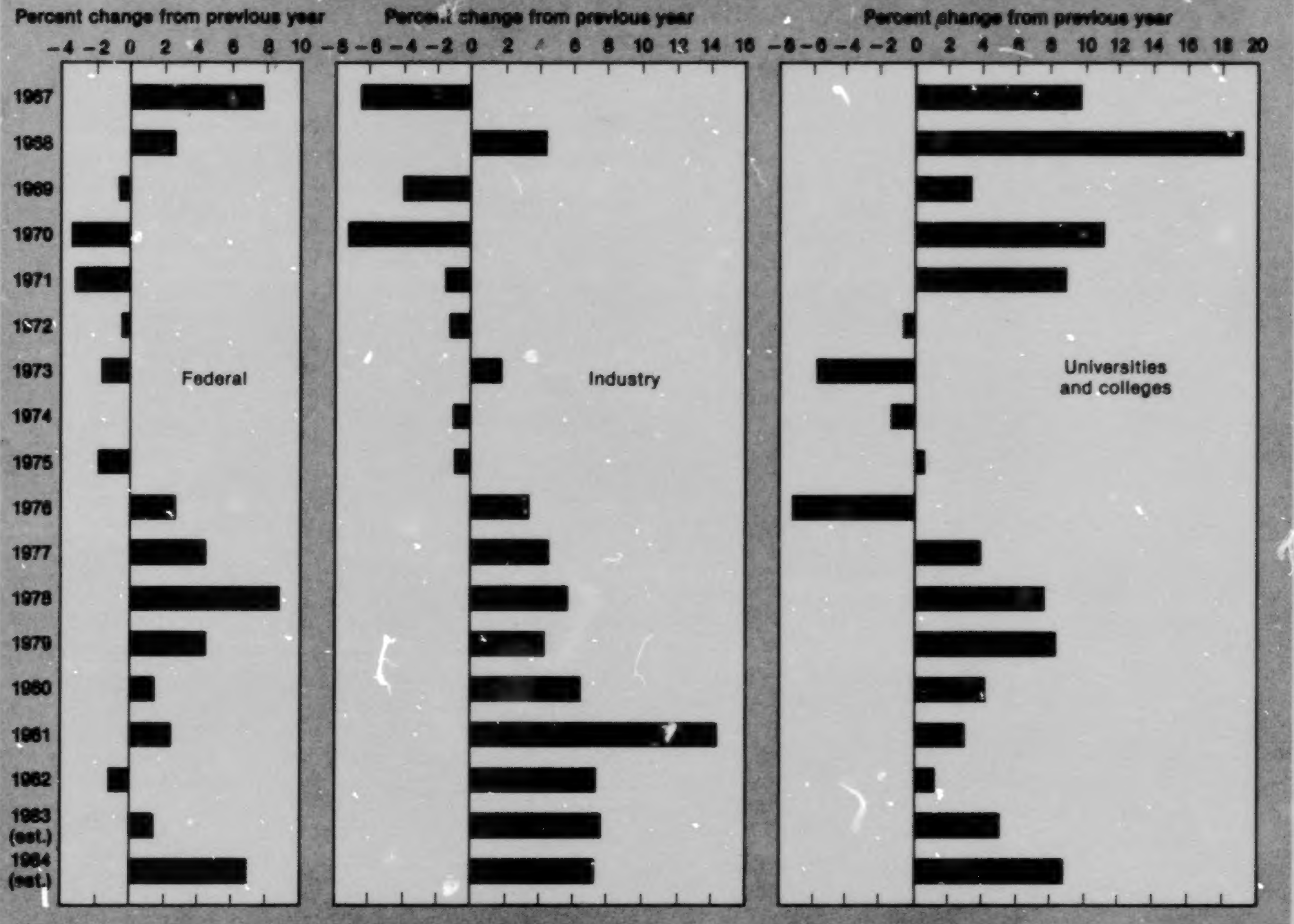
basic research

In 1983 total spending on basic research amounted to an estimated $10.6 billion, a gain of 7 percent over the 1982 level. In real terms national funding for basic research increased by 3 percent between the two years. This continues an 8-year period, beginning in 1975, in which basic research funding increased by nearly one-third in constant dollars. Federal support, which accounts for some 70 percent of the national basic research total, increased 25 percent between 1975 and 1983 while non-Federal support increased by 40 percent (chart 12).

In 1984, national basic research spending is expected to increase nearly 12 percent to $11.8 billion, or 7 percent in real terms. Federal basic research support increased an estimated 7 percent in constant dollars with growth occurring in most defense and nondefense areas.

The second largest supporter of basic research, the industrial sector, accounts for nearly 20 percent of the national total. In 1984 industry support of basic research is expected to reach $2.3 billion, 12 percent more than in the previous year (7 percent after adjustment for inflation). In 1983 industry basic research support went up an estimated 8 percent in real terms over 1982

Chart 12. National basic research spending by source (Based on constant 1972 dollars)



SOURCE: National Science Foundation, appendix table 7

The largest gains, however, are expected in applied research and development.

Between 1975 and 1984 the Federal share of intramural performance decreased from 20 percent to 14 percent for research and from 13 percent to 9 percent for development. All of the research decline was accounted for by Federal support of applied research. Over the same period, industry's performance shares of applied research increased by corresponding amounts, reflecting the Federal Government's attempt to contract more of its levels. Between 1975 and 1982, industrial support of basic research increased at an average annual constant-dollar rate of more than 6 percent, and was directed chiefly to energy-related activities. This followed a 9-year period in which industrial spending for basic research fell at an average constant-dollar rate of 2 percent. During this earlier period, R&D management placed more stringent controls on R&D activities by mandating that R&D projects have clearly defined objectives. As a result, many basic research projects were postponed or cancelled in favor of more goal-oriented activities. In the midseventies, renewed optimism about the long-range potential of basic research, particularly in energy-related areas, was a major factor behind the reversal in this earlier trend.

In 1984, universities and colleges are expected to spend $1.2 billion of their separately budgeted non-Federal funds on basic research, an increase of 13 percent over 1983. In real terms the funding will increase 9 percent between the two years. In 1983 these funds increased in real terms by 5 percent over 1982 levels.

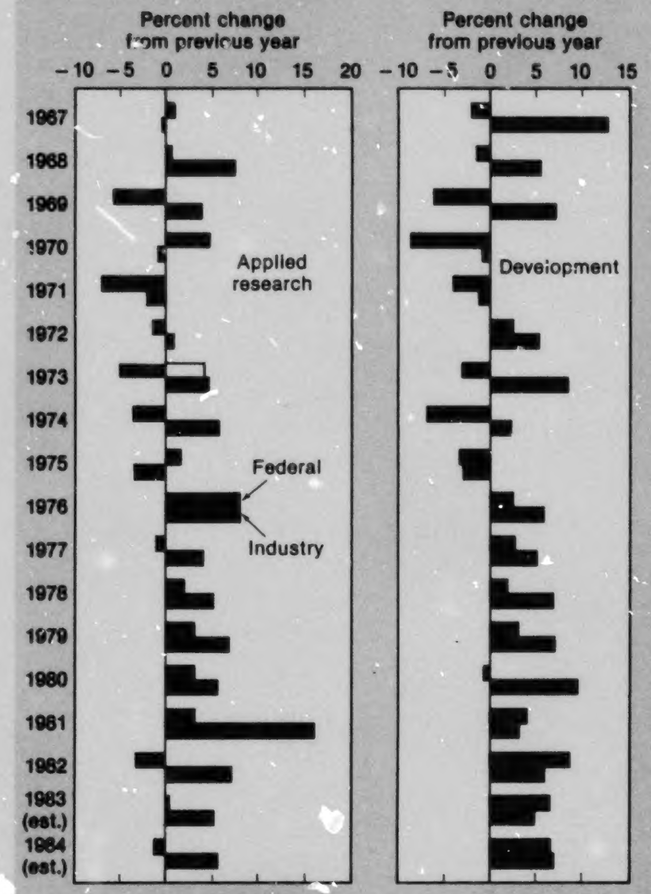
Although universities and colleges support only 10 percent of national basic research funding, they perform nearly one-half of all basic research in the Nation, two-thirds of which is funded by the Federal Government. In 1984 universities and colleges are expected to perform $5.8 billion of basic research, 14 percent more than in 1983. In real terms the increase between the two years is expected to be 9 percent. Industry, the second largest basic research performer, is expected to increase its basic research performance by 12 percent between 1983 and 1984 to $2.3 billion. In addition, industry support of basic research in universities and colleges is expected to increase by 16 percent between the two years to $260 million. Five years ago, industry's support of basic research in universities was less than one-half this amount.

applied research

National spending on applied research is expected to reach $21.4 billion in 1984, 8 percent more than in 1983, a 3-percent increase in real terms. Between 1975 and 1984, national applied research spending is expected to show an average annual constant-dollar increase of 4.6 percent. Increases in industrial support during this period have been the main influence behind this growth (chart 13). Over this period industry's support of applied research has increased at an average annual constant-dollar rate of 7.2 percent. Federal support, on the other hand, increased over the same period by 1.7 percent annually.

Two-thirds of the Nation's applied research is performed within industrial laboratories. In 1984, industry performance is expected to reach $14.2 billion, 8 percent more than in 1983, or 4 percent in real terms. Over 80 percent of industrial applied research performance is provided for out of company's own funds.

Chart 13. Applied research and development spending by source (Based on constant 1972 dollars)



SOURCE: National Science Foundation; appendix tables 9 and 11

The second-largest performer of applied research in the Nation continues to be the Federal Government with an estimated $3.0 billion in 1984. Since 1976 Federal applied research performance has diminished by one-sixth in real terms, because of cutbacks at NASA where spending decreased by nearly one-half in constant dollars between 1976 and 1984. In 1976, 30 percent of total Federal intramural applied research performance was accounted for by NASA; by 1984 the amount is expected to be less than 20 percent.

development

In 1984 national spending on development amounted to $63.7 billion, 11 percent more than in 1983, or 7 percent in real terms. Industry and the Federal Government combined account for over 99 percent of the development support in the Nation. These two sources have both been increasing their development spending in real terms since 1975. Industry support increased at three times the rate of Federal through 1981—6 percent annually versus 2 percent. Since that time, however, Federal support has increased at a faster rate than industry—7 percent annually versus 6 percent—mainly as a result of increased defense spending.

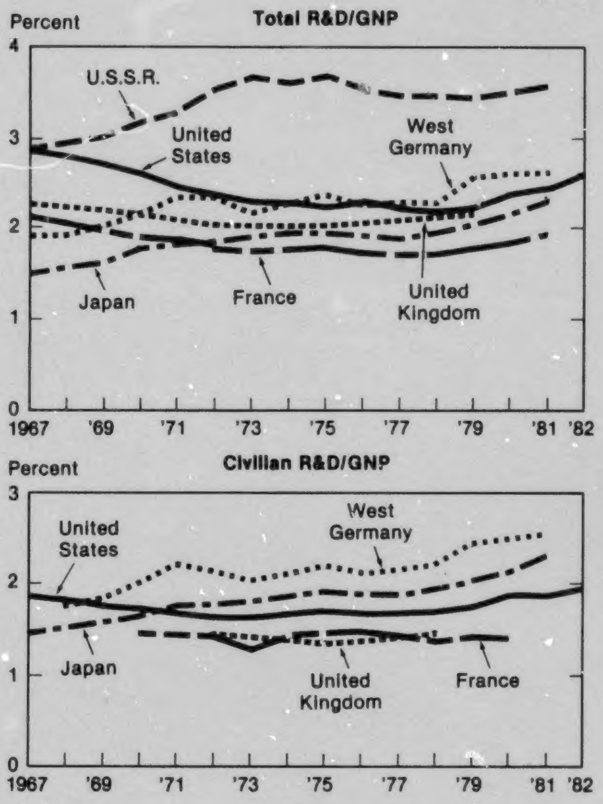
Industry also accounts for nearly 90 percent of the Nation's total development performance. This industrial concentration on development results primarily from the short-term nature of development activities which are closer to production and the market place than are research efforts. In addition, the high costs of equipment and material associated with development make it the most expensive area of R&D work. The Federal Government is the second largest performer of development activities in the Nation with about 10 percent of the total in 1984. In real terms, Federal development performance has increased at an average annual rate of 5 percent since 1981. Over the same period industry development performance increased at an average annual rate of 7 percent.

international comparisons

The relative emphasis that different countries place on R&D activities can be determined by either one of two methods: comparing R&D expenditures to the GNP, or comparing the ratio of R&D scientists and engineers to the labor force. These ratios overcome difficulties of interpretation produced by inflation, different unit costs, and differences in the volume of research efforts. Because differences exist in the manner in which countries compile R&D data, caution must be exercised in making international comparisons, especially in the case of the U.S.S.R.[3]

The United States spends more money on R&D activities than any other country. Also during the sixties the United States had the highest R&D/GNP ratio—3 percent in 1964 (chart 14). After 1964 the U.S. ratio declined because of cutbacks in Federal R&D spending for defense and space while the GNP continued to increase, whereas the ratios in other countries—notably the U.S.S.R., West Germany, and Japan—increased primarily because of large increases in government R&D funding. By the mid-seventies, the U.S. ratio had dropped to 2.3 percent and was exceeded by that in U.S.S.R. (3.7 percent) and equal to that in West Germany. By the late seventies and early eighties, the ratios in all countries had started to increase. In 1984, for example, the U.S. ratio is expected to approach 2.7 percent.

Chart 14. International R&D/GNP



SOURCES: National Science Foundation, Organization for Economic Cooperation and Development, and Robert Campbell (Indiana University); appendix tables 17 and 19

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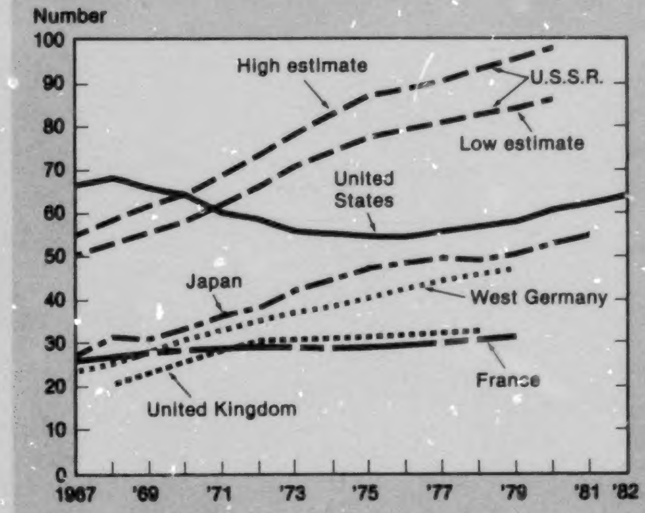
[3] U.S.S.R. data should be treated as rough estimates because Soviet R&D definitions and GNP accounting make international comparisons difficult.

When defense activities are excluded from the R&D data, a somewhat different picture is presented. The resulting ratio in the United States in 1981, for example, was lower than that in some of the larger western economies (1.9 percent in the United States versus 2.6 percent in West Germany and 2.3 percent in Japan). Three-fourths of the U.S. R&D effort is spent on these nondefense activities as compared to better than 90 percent among the other major western nations. During the early to midseventies, the civilian R&D/GNP ratios have remained relatively constant in all countries. The U.S. ratio, however, had shown some small increases as a result of the growing emphasis on energy. With U.S. R&D emphasis now shifting toward defense, this ratio is expected to decrease slightly during 1983 and 1984.

When the number of FTE R&D scientists and engineers is compared to the labor force, the resulting ratio in the United States is higher than that in all other western countries and Japan. In the United States there are about 62 R&D professionals per 10,000 in the labor force. This ratio is exceeded, however, by that in the U.S.S.R. where about 95 R&D professionals are employed per 10,000 labor force (chart 15). The ratio in the United States has been increasing each year since 1976. This trend is expected to continue because the increased Federal emphasis on defense R&D spending and the expected increases in industry R&D funding should exceed employment growth patterns during the 1981-84 period. The ratios in other countries have been increasing annually since the sixties.

Chart 15. International R&D scientists and engineers / 10,000 labor force



SOURCES: National Science Foundation, Organization for Economic Cooperation and Development, and Robert Campbell (Indiana University); appendix table 16

s/e personnel

Most 1982 data on characteristics of the U.S. S/E labor force will be based on the NSF Postcensal Survey, which is carried out every 10 years. Because of the magnitude and complexity of this survey, data were not yet available for this report. They will be published, however, within a few months' issuance of this publication. Information for 1982-83 from other data sources is used whenever possible.

employment trends

Between 1976 and 1981, the number of scientists and engineers employed in S/E jobs expanded at a more rapid rate than total employment, employment of all professional and related workers, and overall economic activity. Employment in S/E jobs increased at an annual rate of about 5.5 percent over the 1976-81 period. Real GNP—an indicator of overall economic activity adjusted for inflation—increased at an annual rate of 3.0 percent, while total U.S. employment and employment of professional and related workers increased at an annual rate of 2.9 percent and 3.8 percent, respectively. Between 1980 and 1981, S/E employment accelerated while gains in GNP and other employment variables slowed substantially. Between 1981 and 1982, however, demand for scientists and engineers moderated because of a change in the pace of economic activity.

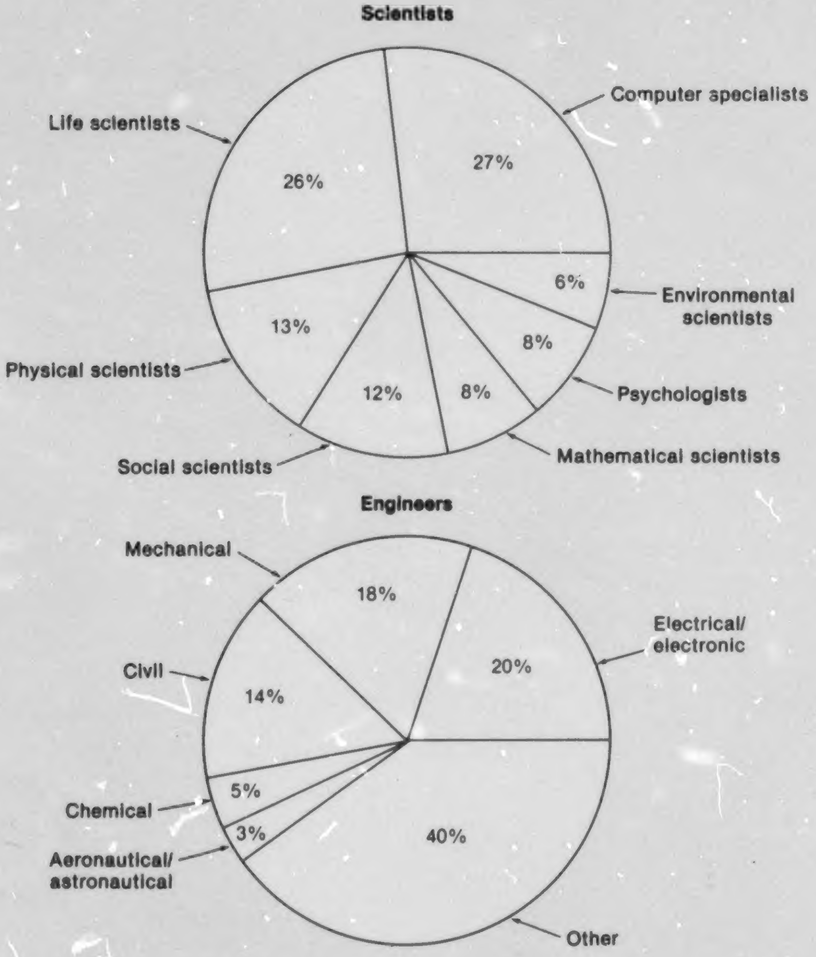
Recent efforts to increase productivity and improve the international competitiveness of U.S. industries, and current levels of defense expenditures, are partially responsible for employment of scientists and engineers increasing more rapidly than overall U.S. employment. The more rapid expansion of S/E jobs in recent years also continues a longer term trend, indicating that an increasing proportion of the work force is engaged in scientific and technical activities. Between 1970 and 1981, employment in S/E jobs increased by about 50 percent while total U.S. employment was up by about 25 percent. S/E job growth since 1970 results about equally from two major factors, general increases in economic activity, and changes in the occupational mix of the U.S. work force.

Over the 1976-81 period, employment growth varied considerably by field, with the number of computer specialists almost doubling. Above-average increases also occurred in the numbers of environmental and life scientists. Among engineers, the largest gain was recorded for those in electrical/electronic fields.

Individuals holding S/E jobs in 1981 were divided about evenly between scientists and engineers. Among scientists, about one-half were either computer specialists or life scientists; electrical/electronic engineers represented the largest single engineering field (chart 16).

The work activities of scientists and engineers are a direct indicator of the character of the U.S. science and technology enterprise. For those holding S/E jobs in 1981, the most frequently

Chart 16. Field distribution of scientists and engineers employed in science/engineering: 1981



SOURCE: National Science Foundation

reported work activity continued to be R&D performance, including R&D management. Many scientists and engineers were also involved in general management, production and related activities, and teaching, with the activities of scientists differing substantially from those of engineers (chart 17).

Although the distribution of work activities has remained relatively stable since the midseventies, the small changes that did occur masked substantial absolute changes in employment. For example, the number of scientists and engineers engaged in production and related activities increased by over 50 percent since the midseventies. Most of this increase was accounted for by engineers in industry, reflecting the added emphasis in industry on improving productivity and quality control.[4]

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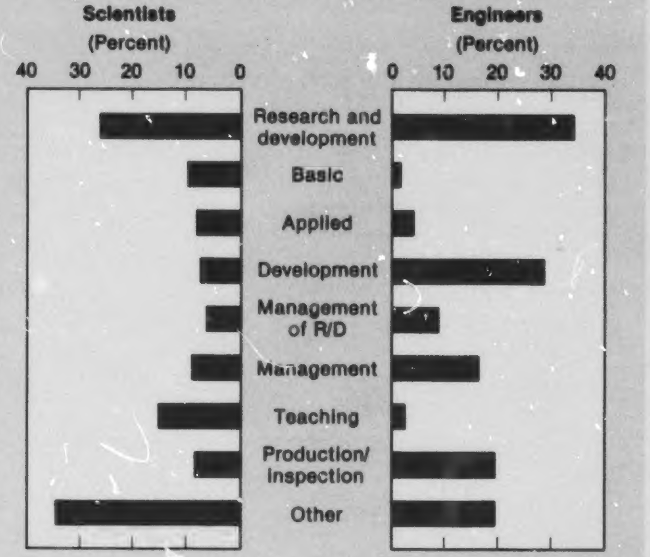
[4] National Science Foundation, *Changing Employment Patterns of Scientists, Engineers, and Technicians, in Manufacturing Industries: 1977-80* (NSF 82-331) (Washington, D.C., 1983).

Chart 17. Distribution of scientists and engineers employed in science/engineering by primary work activity: 1981



SOURCE: National Science Foundation

s/e labor market balance

Almost all scientists and engineers who want to work have jobs. Of the approximately 250,000 who were not working in 1981, most were retired, or were not looking for work for other reasons.

Almost 90 percent of the employed scientists and engineers held S/E jobs in 1981. The proportion holding non-S/E jobs varies between engineers and scientists and among science fields (table 70). Relatively few (less than 15 percent) of those in non-S/E activities reported lack of S/E job opportunities as the reason for their particular employment.

Most measures of S/E labor market balance remained unchanged between 1980 and 1981. An analysis of market indicators for 1981 revealed a pattern of shortages of computer specialists and, to a lesser extent, engineers. For life and mathematical scientists, the market appeared to be in rough balance, and there were adequate supplies of other scientists. As noted above, S/E market conditions between 1981 and 1982 became less favorable as demand slackened because of a general dampening in economic activity.[5] Preliminary 1983 data suggest that the market for computer specialists and engineers is moving toward balance.

A National Science Foundation survey on the demand for new S/E graduates by industry found that the shortages reported in mid-1981 had moderated substantially at all degree levels by mid-1983. Other indicators of market conditions confirm this change in demand. The Deutsch, Shea and Evans High Technology Recruitment Index shows a significant decline in advertising space dedicated to S/E jobs between 1981 and 1982. In 1981, this index was 135 (1961=100), by 1982, it had declined to 104, and fell below 100 in early 1983. In addition, the College Placement Council reports a substantial decrease (24 percent) in the average number of offers to S/E bachelor's-degree recipients between 1981 and 1982. Data for 1983 show a continuation of this downward trend.

A substantial drop in the number of job vacancies listed with State Employment Services is additional evidence that the demand for scientists and engineers has moderated—vacancies were down about 44 percent between May 1981 and May 1982 followed by a minor uptrend by May 1983. Of those vacancies in both 1982 and 1983, over one-half were for engineers (primarily electrical/electronic, industrial and mechanical), and over 10 percent were for computer specialists.

Unemployment statistics from the Bureau of Labor Statistics also show changes in supply/demand conditions. Among engineers, for example, the unemployment rate rose from 1.4 percent to 2.4 percent between 1981 and 1982. Unemployment rates for the first two quarters of 1983 were 3.7 percent and 2.8 percent, respectively. Among science fields, the unemployment rate rose from about 2.5 percent in 1981 to 3 percent in 1982 and then was 2.1 percent and 3.3 percent, respectively, in the first two quarters of 1983. Unemployment rates for scientists and engineers, however, were still substantially below the rate for all workers—8.8 percent in mid-1983.

sectoral patterns and trends

Business and industry is the largest employer of both scientists and engineers.[6] In 1981, about three-fourths of all engineers and almost one-half of all scientists were employed in this sector. Since the midseventies, the sectoral distribution of employed scientists and engineers has changed slightly. There was a small increase in the share employed in business and industry and corresponding declines in educational institutions and the Federal Government.

S/E employment in industry has gone up steadily since 1976, reaching about 1.9 million by 1981. Engineers and computer specialists accounted for about 75 percent of the growth.

Advancement in employment of scientists and engineers significantly outpaced overall gains in business and industry. While S/E employment went up about 8 percent per year between 1976 and 1981, total employment in business and industry went up roughly 3 percent per year. The more rapid increases in employment of scientists and engineers resulted from their relatively greater concentration in high-technology industries. Here, the overall rise in employment has been swift, and a change in the occupational mix of industrial employment has occurred.

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[5] National Science Foundation, "Labor Market Slackens for New Science and Engineering Graduates," *Science Resources Studies Highlights* (NSF 82-330) (Washington, D.C., November 22, 1982).

[6] Includes those holding jobs in both S/E and non-S/E fields.

The importance of business and industry in providing employment opportunities for scientists and engineers varies considerably by field. This sector employs about 75 percent of all computer specialists, and over 60 percent of all chemists, but less than 20 percent of all psychologists.

In addition to scientists and engineers, over 1 million S/E technicians are employed in the private sector of the economy. These technicians, generally less skilled than scientists and engineers, usually support scientists and engineers in many phases of their work. The ratio of technicians to scientists and engineers provides a measure of the amount of technical support provided to scientists and engineers. The ratio for business and industry was 0.8 in 1982, showing that for every 100 scientists or engineers, there were 80 technicians. The ratio varies widely among industries (chart 18), with manufacturing industries having lower technical support ratios than the nonmanufacturing and service industries. The wide variations shown in chart 18 result from three factors: (1) the specific technology used in each industry; (2) the substitutability of technicians with other occupations; and, (3) the relative costs of technicians versus scientists or engineers.

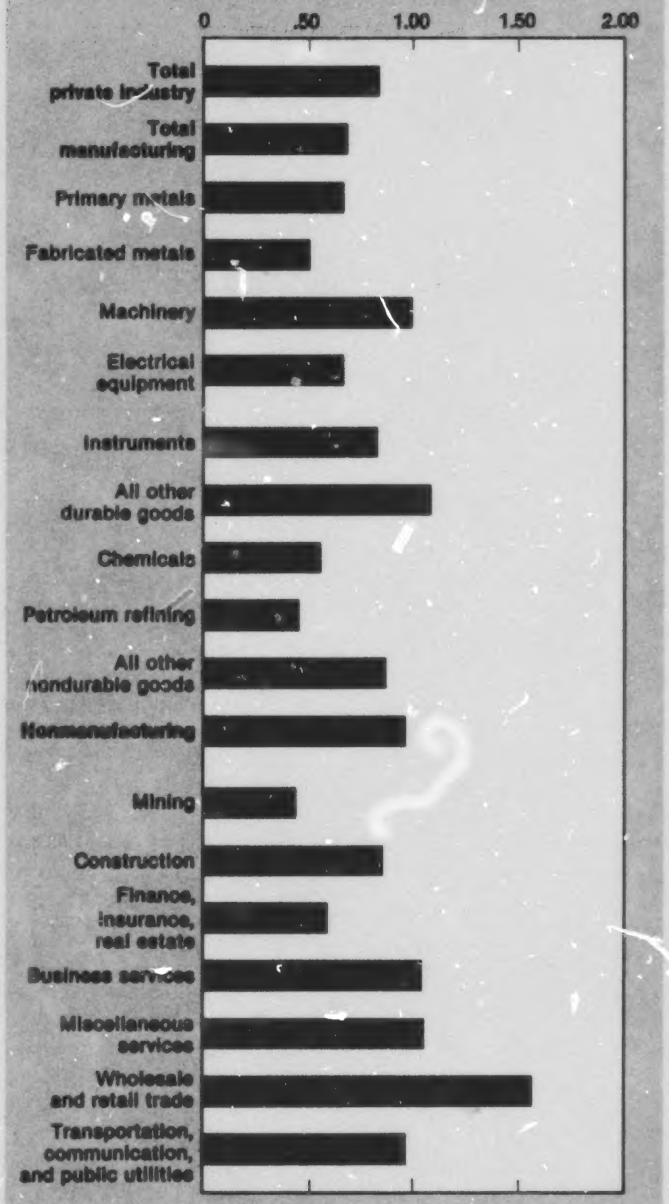
The importance of academe in providing employment opportunities varies substantially by field. For example, this sector employs less than 5 percent of all engineers, but more than one-half of all mathematical scientists. As with engineers, only a small fraction of the Nation's computer specialists were academically employed in 1981.

Overall employment in educational institutions may overstate job opportunities because of the increasing number of part-time jobs in that sector. Between 1981 and 1982, part-time employment growth (9 percent) rose at three times the full-time rate (3 percent).[7] A large part of the increase in part-time academic employment was accounted for by those in the mathematical/computer science fields, up 17 percent. For all fields combined, over 40 percent of the growth in part-time employment took place in 2-year rather than 4-year institutions.

The above-average growth in part-time employment resulted from several factors. In some fields (e.g., computer sciences), institutions may be unable to attract full-time staff at current salary levels. In other fields, institutions can reduce expenses by hiring part-time, less costly faculty—a more flexible personnel resource.

Federal Government S/E employment increased at an annual average rate of over 4 percent between 1976 and 1981, substantially slower than the increases in business and industry. The approximately 270,000 scientists and engineers in the Federal Government represented about 8.5 percent of the total employed in 1981.

Chart 18. Ratio of technicians to scientists and engineers in private industry by selected sector: 1982



SOURCE: National Science Foundation

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[7] National Science Foundation, unpublished data.

doctoral scientists and engineers[8]

About 343,000 scientists and engineers with doctorates were employed in 1981, representing an annual average increase of 4.6 percent since 1979. Over the 1973-79 period, employment of S/E doctorates increased at an annual average rate of 6.1 percent. The slower growth in S/E doctorate employment in recent years is primarily the result of a tapering off in the academic sector, the major employer, reflecting a slowdown in enrollment growth. Demographic projections indicate that this trend is likely to continue through the mideighties and that enrollment may register an actual decline. Between 1979 and 1981, employment of S/E doctorates in educational institutions increased by less than one-half the rate reported in business and industry (7.4 percent versus 19.6 percent).

The relatively slow growth in academic employment of S/E doctorates resulted in a high and increasing proportion of faculty with tenure, and has had an impact on the incoming number of recent doctorates (young investigators).[9] There is widespread belief that the presence of younger doctorates is essential to the continued vitality of research in universities. Efforts to increase their number in faculty positions, however, are likely to be influenced by the overall financial health of the institution, trends in enrollments, and alternative employment opportunities.

Differences in growth across fields indicate a consistent pattern of shifts in employment away from the physical and mathematical sciences towards engineering and computer specialties. In the 1979-81 period, employment of computer specialists grew at a rate more than three times the average (34 percent versus 9.5 percent), while the engineering employment increase (11.3 percent) was about 20 percent higher than the average.

Scientists and engineers with doctorates are a relatively stable component of the work force. In 1981, about 11 percent of S/E employees held doctorates, about the same as in 1976. This proportion varies substantially by field, however, with scientists much more likely than engineers to hold doctoral degrees. Excluding computer specialists, others holding doctorates were scientists, over 20 percent; engineers, 4 percent; and computer specialists, 2 percent. The relatively low proportions of computer specialists and engineers reflect the fact that the bachelor's degree is frequently the accepted level for entry into these two fields.

women and minorities

Despite above average increases in employment, women and minorities continue to be underrepresented in science and engineering. Over the 1976-81 period, employment of women scientists and engineers almost doubled. The approximately 420,000 employed women scientists and engineers in 1981 represented about 13 percent of the S/E total, compared to less than 10 percent in 1976. Women represent, however, over 40 percent of all employed persons and all professional and related workers.[10]

The almost doubling of female S/E employment was paced by an over 200-percent increase in the number of women computer specialists between 1976 and 1981.

Employment of both black and Asian scientists and engineers increased more rapidly than the employment of whites over the 1976-81 period. The 64,000 S/E blacks in 1981 represented about 2 percent of all scientists and engineers. Despite a rapid increase since 1976, blacks are clearly underrepresented in S/E activities since they represent about 7 percent of those in all professional and related jobs.

Persons of Hispanic origin are underrepresented in the doctoral S/E work force.[11] Although over 5 percent of all employed persons 20 years of age and older claimed Hispanic origins, and about 2.6 percent of all professional and related workers were Hispanic in 1981, the 4,800 Hispanic S/E doctorates represented only about 1.4 percent of all employed S/E doctorates for the same year. The number of employed Hispanic doctoral scientists and engineers has more than doubled since 1977, when the approximately 2,200 Hispanics represented less than 1 percent of all employed doctoral scientists and engineers.

Both Hispanic and non-Hispanic doctoral scientists and engineers show roughly similar distributions by field: in 1981 about 25 percent were life scientists, and about 20 percent physical scientists. On the other hand, Hispanics were somewhat more likely than their non-Hispanic colleagues to be social scientists or psychologists, and somewhat less likely to be engineers or environmental scientists.

s/e pipeline

Trends and flows within the S/E pipeline provide significant indicators as to both the quality and quantity of the potential supply of new scientists and engineers. The process begins with the precollege experiences of potential S/E students. The number of mathematics and science courses taken in high school and scores on standardized tests measuring quantitative ability can be important preconditions for entering S/E degree programs. An analysis of these precollege experiences can give insight into the numbers of students who could enter S/E programs in college. Thereafter, indicators of future supply can be gleaned by examining S/E degree production and then reviewing the transition of these degree recipients into the work force

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[8] Detailed data on doctorate-level scientists and engineers are collected on a biennial basis. The most recent survey in this series was conducted in 1981.

[9] See National Science Foundation, "Tenure Practices in Universities and 4-year Colleges Affect Faculty Turnovers," *Science Resources Studies Highlights* (NSF 81-300) (Washington, D.C., February 23, 1981), and *Young and Senior Science and Engineering Faculty, 1980* (NSF 81-319) (Washington, D.C., June 1981).

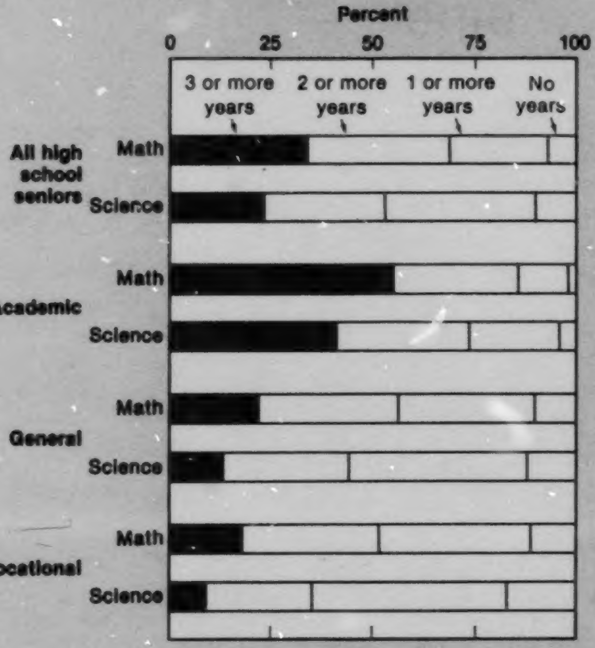
[10] Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 29, (January 1982), p. 165.

[11] Hispanics are a diverse ethnic group and it would be desirable to distinguish between Mexican/Americans, Puerto Ricans, and other Hispanics. Because of data constraints, however, Hispanics in this discussion must be treated in aggregate and the discussion limited to Hispanic scientists and engineers holding doctorates. Efforts are currently underway by the National Science Foundation to improve and expand the data on Hispanic scientists and engineers.

precollege math and science

A student's decision whether to take mathematics and science courses at the precollege level can be an important factor in choosing college majors and/or careers. In 1980, about one-third of the high school seniors had taken three or more years of math, and slightly less than one-quarter had taken three or more years of science. When coursetaking is stratified by curriculum, however, wide variations appear (chart 19). For instance, 55 percent of those students in academic curriculums, compared to 22 percent in general and 18 percent in vocational programs, had taken three or more years of mathematics in 1980.[12] Since 1972, the share of students enrolled in academic curriculums has fallen 4 percentage points while the number in general studies programs has risen by a like amount. As students in academic programs are a major source of S/E candidates, this trend has significant implications in the mid- to late eighties when the number of students of high school age in the population begins to decline.

Chart 19. Cumulative percentage of 1980 high school seniors taking varying amounts of math and science courses by curriculum

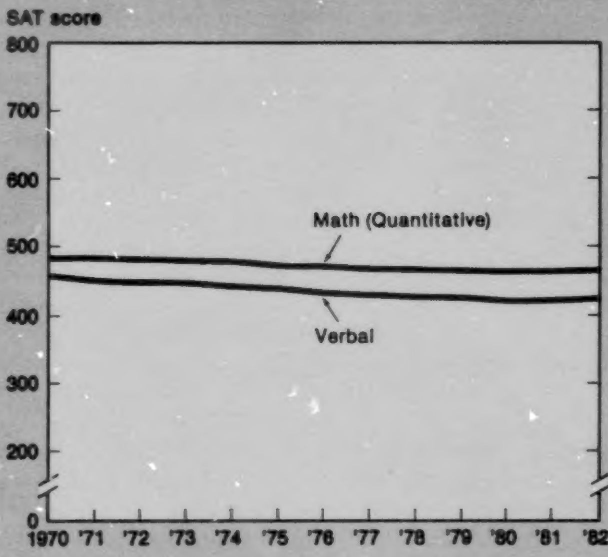


SOURCE: National Center for Education Statistics

Scores on the SAT is another measure of precollege experiences and is widely used by colleges in admissions decisions. The SAT contains a verbal and mathematics aptitude test and offers achievement tests in 15 academic subjects.

SAT scores have declined significantly since 1970 (chart 20). By 1982, scores on the mathematics component (467) had fallen 21 points while verbal scores (426) declined by 34 points. Students who plan to major in an S/E field at the undergraduate level, however generally had higher scores than other college-bound seniors. For example, students planning to major in engineering had verbal scores of 449 and mathematics scores of 537, compared to 394 and 419, respectively, for those planning to major in education. Overall, students planning to major in an S/E field scored 446 (verbal) and 503 (mathematics) in 1982. The SAT scores of those planning to major in science or engineering have remained relatively stable over time.

Chart 20. Scholastic Aptitude Test (SAT) scores for college-bound seniors: 1970-82



SOURCE: Admissions Testing Program of the College Board, Educational Testing Service

s/e degree production

The number of new entrants into the S/E labor force, drawn from new S/E graduates, is an important determinant of the future pool of scientists and engineers. The 295,000 S/E bachelor's degrees awarded in 1981 showed an increase for the first time since 1974, the peak year (chart 21). Although the 1981 number was 3.6 percent below the 1974 level, it was 1 percent above that awarded in 1980. This net gain resulted from the rapid increase in engineering and computer science degrees awarded. Both fields showed increases of more than 4,000 degrees over the 1-year

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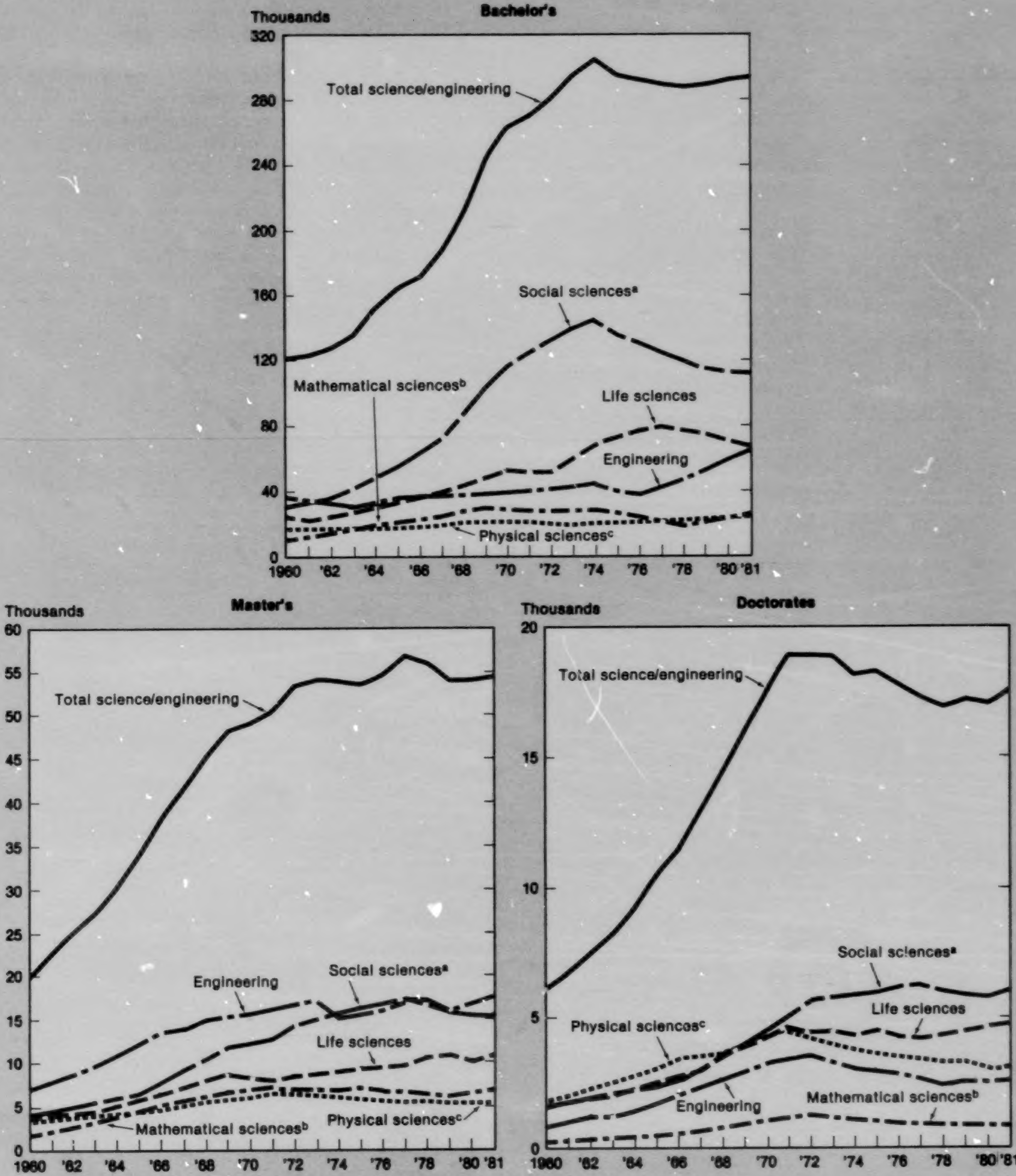
[12] Of the 1980 high school seniors, 39 percent reported being enrolled in academic programs, 37 percent in general programs and 24 percent in vocational programs. National Center for Education Statistics, *High School and Beyond* (Washington, D.C.), p. 1.

Chart 21. Science and engineering degree production: 1960-81



[a] Includes psychology.

[b] Includes computer sciences.

[c] Includes environmental sciences.

SOURCE: National Science Foundation and National Academy of Sciences period, far outweighing the decreases in mathematics, psychology, and the life and social sciences. The number of recipients of bachelor's degrees in S/E fields continued to account for about 30 percent of all bachelor's degrees awarded.

S/E master's degrees also increased slightly between 1980 and 1981, less than [illegible] percent, but still almost 4 percent below the peak year (1977) (chart 21). As in the case of S/E bachelor's degrees, the increase was caused by a rise in the number of engineering and computer science degrees awarded. Excluding physical sciences, the number of degrees awarded in all other major S/E fields declined. The 55,000 S/E master's degree recipients in 1981 represented 18 percent of the total, unchanged from recent years.

The trend among S/E doctorate recipients was similar to that of S/E baccalaureates: peaking in the early seventies, then declining and, finally, rising between 1980 and 1981 (chart 21). The number of S/E doctorates granted rose to 17,600 in 1981, a 2.5-percent increase since 1980. Increases occurred in all major fields with the exception of the mathematical sciences, where degree production remained relatively stable.

It should be noted that the share of S/E doctorates awarded to U.S. citizens has been declining. Compared to 1971, the number in 1981 was down 13 percent to 13,300. The proportion of U.S. citizens among S/E doctorates fell slightly over the period from 81 percent to 78 percent.

Engineering was the field with the highest proportion of non-U.S. citizen doctorate recipients in 1981 (51 percent). Other fields in which foreign citizens accounted for relatively large shares of 1981 doctorates were agriculture (38 percent) and mathematics (31 percent).

the transition from school to work

The transition of recent S/E graduates at all degree levels from school to work completes the S/E pipeline which began at the precollege level. Excluding full-time graduate students, most recent graduates (95 percent at all degree levels) participate actively in the labor force, i.e., working or seeking work. Despite the decline in economic activity in 1982, employment opportunities remained high for recent baccalaureate recipients entering S/E occupations for which the baccalaureate is the entry-level professional degree. Thus, there was almost no unemployment in 1982 among 1980 and 1981 graduates in computer science and a very low rate (2.9 percent) for engineering graduates. These rates vary by both field and level of degree. The highest rates were found among those with only bachelor's degrees and, regardless of degree level, among those with degrees in the social sciences.

Only a fraction of those earning S/E bachelor's and master's degrees in 1980 and 1981 were in S/E employment. (See table.) This low proportion can be attributed to three major factors: (1) A substantial fraction (about 20 percent at both the bachelor's level and master's level) postpone entry into the labor force by pursuing full-time graduate studies; (2) a relatively small fraction are not employed, either because they choose to remain outside the labor force or because they are unable to find employment (9 percent and 5 percent, respectively); and, (3) not all individuals who find employment especially at the bachelor's level, find S/E employment because more than a bachelor's degree may be required for jobs in certain scientific fields. In 1982, about 40 percent of the employed bachelor's-degree recipients were in non-S/E jobs with wide variations among fields. This proportion declined significantly at advanced degree levels; about 25 percent of the employed master's-degree recipients and about 5 percent of the doctorate-holders worked in non-S/E fields.

Transition of 1980 and 1981 science/engineering (S/E) graduates from school to work in 1982

Degree level/ field	Total	Employed			Full-time graduates students	Not employed	
		Total	In S/E	Outside S/E		Seeking employment	Outside labor force
	Percent						
	BACHELOR'S DEGREES						
All S/E	100	71	43	28	21	5	4
Physical sciences[1]	100	53	41	12	40	4	3
Mathematics	100	80	57	23	13	4	4
Computer specialties	100	94	85	9	3	2	1
Engineering	100	89	78	10	7	3	2
Life sciences	100	58	74	24	33	5	5
Social sciences[2] .	100	68	21	46	22	6	5
	MASTER'S DEGREES						
All S/E	100	74	55	19	21	3	2
Physical sciences[1]	100	65	47	18	29	3	3
Mathematics	100	77	56	21	17	3	3
Computer specialties	100	88	76	12	10	1	1
Engineering	100	82	72	11	14	2	2
Life sciences	100	65	47	17	31	2	3
Social sciences[2] .	100	68	34	34	24	6	3

[1] Includes environmental sciences

[2] Includes psychology

SOURCE: National Science Foundation

appendix

statistical tables

appendix

statistical tables

r&d resources

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Table 1. Transfers of funds expended annually for performance of research and development by sector, distributed by source: 1953, 1960, and 1965-84[1]

[Dollars in millions]

Year	Total	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2] [4]			
			Source		Sources			Sources					Source		Sources		
		Total funds used	Federal Government	Total funds used	Federal Government	Industry[5]	Total funds used	Federal Government	Industry	Universities and colleges[3]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[5]
1953	5,124	1,010	1,010	3,630	1,430	2,200	255	138	19	72	26	121	121	108	54	26	28
1960[6]	13,523	1,726	1,726	10,509	6,081	4,428	646	405	40	149	52	360	360	282	166	48	68
1965[7]	20,044	3,093	3,093	14,185	7,740	6,445	1,474	1,073	41	267	93	629	629	663	477	62	124
1966	21,846	3,220	3,220	15,548	8,332	7,216	1,715	1,261	42	304	108	630	630	733	525	70	138
1967	23,146	3,396	3,396	16,385	8,365	8,020	1,921	1,409	48	346	118	673	673	771	552	74	145
1968	24,605	3,494	3,494	17,429	8,560	8,869	2,149	1,573	56	389	131	719	719	814	582	81	151
1969	25,631	3,503	3,503	18,308	8,451	9,857	2,225	1,600	60	420	145	725	725	870	616	93	161
1970	26,134	4,079	4,079	18,067	7,779	10,288	2,335	1,648	61	461	165	737	737	916	648	96	172
1971	26,676	4,228	4,228	18,320	7,666	10,654	2,500	1,724	70	529	177	716	716	912	630	98	184
1972	28,477	4,590	4,590	19,552	8,017	11,535	2,630	1,795	74	574	187	753	753	952	653	101	198
1973	30,718	4,762	4,762	21,249	8,145	13,104	2,884	1,985	84	613	202	817	817	1,006	690	105	211
1974	32,864	4,911	4,911	22,887	8,220	14,667	3,023	2,032	96	677	218	865	865	1,178	822	115	241
1975	35,213	5,354	5,354	24,187	8,605	15,582	3,409	2,288	113	749	259	987	987	1,276	875	126	275
1976	39,018	5,769	5,769	26,997	9,561	17,436	3,729	2,512	123	810	284	1,147	1,147	1,376	925	135	316
1977	42,783	6,012	6,012	29,825	10,485	19,340	4,067	2,726	139	888	314	1,384	1,384	1,495	987	150	358
1978	48,129	6,811	6,811	33,304	11,189	22,115	4,625	3,069	170	1,027	359	1,717	1,717	1,672	1,100	165	407
1979	54,933	7,417	7,417	38,226	12,518	25,708	5,361	3,608	180	1,200	373	1,935	1,935	1,994	1,350	180	464
1980	62,618	7,632	7,632	44,505	14,029	30,476	6,060	4,094	226	1,333	407	2,246	2,246	2,175	1,450	200	525
1981	71,912	8,425	8,425	51,856	16,383	35,473	6,818	4,559	268	1,543	448	2,488	2,488	2,325	1,550	225	550
1982	80,317	9,141	9,141	59,011	19,059	39,952	7,261	4,747	328	1,583	603	2,479	2,479	2,425	1,625	250	550
1983 (est.)	87,678	10,228	10,228	64,600	20,900	43,700	7,675	4,900	375	1,860	540	2,600	2,600	2,575	1,700	275	600
1984 (est.)	96,975	10,800	10,800	72,000	23,350	48,650	8,605	5,500	425	2,080	600	2,770	2,770	2,800	1,850	300	650

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Includes State and local government funds.

[6] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[7] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

Table 7. Transfers of funds expended annually for performance of basic research by sector, distributed by source: 1953, 1960, and 1965-84[1]

[Dollars in millions]

Year	Total	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2] [4]			
			Source		Sources			Sources[5]					Source		Sources		
		Total funds used	Federal Government	Total funds used	Federal Government	Industry[6]	Total funds used	Federal Government	Industry	Universities and colleges[6]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[6]
1953	441	101	101	151	19	132	110	73	12	10	15	33	33	46	25	9	12
1960[7]	1,197	160	160	376	79	297	433	299	24	72	38	97	97	131	80	21	30
1965[8]	2,555	364	364	592	186	406	1,138	879	26	164	69	208	208	253	172	29	52
1966	2,814	385	385	624	173	451	1,303	1,008	27	197	71	227	227	275	185	32	58
1967	3,056	435	435	629	202	427	1,457	1,124	31	223	79	250	250	285	190	34	61
1968	3,296	432	432	642	180	462	1,649	1,251	36	276	86	276	276	297	197	37	63
1969	3,441	532	532	618	160	458	1,711	1,279	39	298	95	275	275	305	195	43	67
1970	3,549	577	577	602	158	444	1,796	1,286	40	360	110	269	269	305	189	44	72
1971	3,672	586	586	590	134	456	1,914	1,349	46	400	119	260	260	322	200	45	77
1972	3,829	625	625	593	130	463	2,022	1,430	53	415	134	244	244	345	214	47	84
1973	3,946	608	608	631	132	499	2,053	1,454	57	408	134	297	297	357	218	49	90
1974	4,239	696	696	699	163	536	2,154	1,525	61	432	136	285	285	405	246	54	105
1975	4,608	734	734	730	157	573	2,410	1,664	72	476	198	309	309	425	245	60	120
1976	4,977	786	786	819	185	634	2,549	1,841	71	475	162	359	359	484	285	64	135
1977	5,537	914	914	911	210	701	2,800	2,007	79	527	187	402	402	510	290	70	150
1978	6,392	1,029	1,029	1,035	250	785	3,176	2,264	99	605	208	567	567	585	335	80	170
1979	7,257	1,089	1,089	1,158	265	893	3,612	2,572	113	711	216	718	718	680	400	85	195
1980	8,089	1,182	1,182	1,325	290	1,035	4,026	2,841	135	805	245	786	786	770	450	95	225
1981	9,217	1,302	1,302	1,641	328	1,313	4,576	3,248	167	909	252	863	863	835	495	105	235
1982	9,886	1,465	1,465	1,850	350	1,500	4,851	3,393	190	983	285	870	870	850	510	115	225
1983 (est.)	10,610	1,650	1,650	2,050	375	1,675	5,135	3,525	225	1,075	310	900	900	875	520	125	230
1984 (est.)	11,850	1,800	1,800	2,300	425	1,875	5,850	4,030	260	1,220	340	975	975	925	545	135	245

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[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Distribution by non-Federal sources has been estimated for all years.

[6] Includes State and local government funds.

[7] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[8] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

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Table 3. Transfers of funds expended annually for performance of applied research by sector, distributed by source: 1953, 1960, and 1965-84[1]

[Dollars in millions]

		Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[4]			
			Source		Sources			Sources[5]					Source		Sources		
Year	Total	Total funds used	Federal Government	Total funds used	Federal Government	Industry[6]	Total funds used	Federal Government	Industry	Universities and colleges[6]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[6]
1953	1,279	345	345	726	288	438	130	57	6	57	10	44	44	34	13	11	10
1960[7]	3,020	595	595	2,029	833	1,196	179	88	13	66	12	122	122	95	50	17	28
1965[8]	4,339	990	990	2,858	1,038	1,820	279	157	13	88	21	204	204	208	135	21	52
1966	4,601	997	997	2,843	1,039	1,804	328	184	13	99	32	207	207	226	145	24	57
1967	4,780	1,027	1,027	2,915	1,066	1,849	374	222	15	102	35	219	219	245	160	25	60
1968	5,131	1,110	1,110	3,124	1,043	2,081	404	254	16	97	37	231	231	262	172	28	62
1969	5,316	1,114	1,114	3,287	1,015	2,272	407	246	16	105	40	210	210	298	200	32	66
1970	5,720	1,327	1,327	3,427	1,049	2,378	427	268	16	98	45	216	216	323	220	33	70
1971	5,739	1,302	1,302	3,415	974	2,441	474	292	19	115	48	210	210	338	230	34	74
1972	5,984	1,360	1,360	3,514	952	2,562	524	320	18	140	46	221	221	365	251	35	79
1973	6,597	1,480	1,480	3,825	993	2,832	713	461	23	172	57	226	226	353	234	36	83
1974	7,228	1,574	1,574	4,288	1,025	3,263	736	438	29	203	66	217	217	413	280	40	93
1975	7,863	1,730	1,730	4,570	1,130	3,440	851	516	34	224	77	264	264	448	300	43	105
1976	9,046	2,093	2,093	5,112	1,200	3,912	1,016	584	43	283	106	327	327	498	330	48	120
1977	9,745	2,044	2,044	5,636	1,325	4,311	1,067	607	46	303	111	485	485	533	345	53	135
1978	10,844	2,192	2,192	6,300	1,430	4,870	1,213	673	56	354	130	549	549	590	385	55	150
1979	12,372	2,392	2,392	7,225	1,555	5,670	1,465	863	64	404	134	580	580	710	480	60	170
1980	14,060	2,484	2,484	8,450	1,900	6,550	1,691	1,025	90	428	148	700	700	735	460	85	190
1981	16,912	2,732	2,732	10,725	2,340	8,385	1,865	1,085	96	513	171	800	800	790	515	75	200
1982	18,444	2,729	2,729	12,100	2,550	9,550	1,995	1,121	106	580	188	795	795	825	540	65	220
1983 (est.)	19,897	2,927	2,927	13,150	2,350	10,800	2,095	1,125	115	655	200	825	825	900	580	95	225
1984 (est.)	21,400	3,000	3,000	14,250	2,450	11,800	2,280	1,210	125	720	225	870	870	1,000	650	105	245

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Distribution by non-Federal sources has been estimated for all years.

[6] Includes State and local government funds.

[7] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[8] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

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Table 4. Transfers of funds expended annually for performance of development by sector, distributed by source: 1953, 1960, and 1965-84[1]

[Dollars in millions]

Year	Total	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2] [4]			
		Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry[4]	Total funds used	Sources[5]: Federal Government	Sources[5]: Industry	Sources[5]: Universities and colleges[6]	Sources[5]: Other nonprofit institutions	Total funds used	Source: Federal Government	Total funds used	Sources: Federal Government	Sources: Industry	Sources: Other nonprofit institutions[6]
1953	3,404	564	564	2,753	1,123	1,630	15	8	1	5	1	44	44	28	16	6	6
1960[7]	9,306	971	971	8,104	5,169	2,935	34	18	3	11	2	141	141	56	36	10	10
1965[8]	13,150	1,739	1,739	10,935	6,516	4,419	57	37	2	15	3	217	217	202	170	12	20
1966	14,431	1,838	1,838	12,081	7,120	4,961	84	59	2	18	5	196	196	232	195	14	23
1967	15,310	1,934	1,934	12,841	7,097	5,744	90	63	2	20	5	204	204	241	202	15	24
1968	16,178	1,952	1,952	13,663	7,337	6,326	96	68	3	17	8	212	212	255	213	16	26
1969	16,874	1,857	1,857	14,403	7,276	7,127	107	75	5	17	10	240	240	267	221	18	28
1970	16,865	2,175	2,175	14,038	6,572	7,466	112	84	5	13	10	252	252	288	240	18	30
1971	17,265	2,340	2,340	14,315	6,558	7,757	112	83	5	14	10	246	246	252	200	19	33
1972	18,664	2,605	2,605	15,445	6,935	8,510	84	55	3	19	7	288	288	242	188	19	36
1973	20,175	2,674	2,674	16,793	7,020	9,773	118	70	4	33	11	294	294	296	238	20	38
1974	21,397	2,641	2,641	17,900	7,032	10,868	133	71	6	42	14	363	363	360	297	21	42
1975	22,742	2,890	2,890	18,887	7,318	11,569	148	78	7	47	16	414	414	403	330	22	51
1976	24,995	2,890	2,890	21,066	8,176	12,890	164	87	9	52	16	461	461	414	330	23	61
1977	27,501	3,054	3,054	23,278	8,950	14,328	200	112	14	58	16	517	517	452	352	27	73
1978	30,893	3,590	3,590	25,969	9,509	16,460	236	122	15	78	21	601	601	497	380	30	87
1979	35,304	3,936	3,936	29,843	10,698	19,145	284	180	16	65	23	637	637	604	470	35	99
1980	40,469	3,966	3,966	34,730	11,839	22,891	343	208	20	90	25	760	760	670	520	40	110
1981	45,783	4,391	4,391	39,492	13,714	25,778	377	225	26	101	25	823	823	700	540	45	115
1982	51,987	4,947	4,947	45,061	16,159	28,902	415	235	30	120	30	814	814	750	575	50	125
1983 (est.)	57,171	5,651	5,651	49,400	17,875	31,525	445	250	35	130	30	875	875	800	600	55	145
1984 (est.)	63,725	6,000	6,000	55,450	20,275	35,175	475	260	40	140	35	925	925	875	655	60	160

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[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Data since 1973 have been estimated based on a survey conducted in that year.

[5] Distribution by non-Federal sources has been estimated for all years.

[6] Includes State and local government funds.

[7] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[8] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

SOURCE: National Science Foundation

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Table 5. Sources of funds for research and development by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	5,124	2,753	2,245	72	54
1960[1]	13,523	8,738	4,516	149	120
1965[2]	20,044	13,012	6,548	267	217
1966	21,846	13,968	7,328	304	246
1967	23,146	14,395	8,142	345	264
1968	24,605	14,928	9,005	390	282
1969	25,631	14,895	10,010	420	306
1970	26,134	14,892	10,444	461	337
1971	26,676	14,964	10,822	529	361
1972	28,477	15,808	11,710	574	385
1973	30,718	16,399	13,293	613	413
1974	32,864	16,850	14,878	677	459
1975	35,213	18,109	15,820	749	535
1976	39,018	19,914	17,694	810	600
1977	42,783	21,594	19,629	888	672
1978	48,129	23,876	22,450	1,037	766
1979	54,933	26,815	26,081	1,200	837
1980	62,618	29,451	30,911	1,323	933
1981	71,912	33,402	35,989	1,523	998
1982	80,317	37,053	40,528	1,683	1,053
1983 (est.)...	87,678	40,328	44,350	1,860	1,140
1984 (est.)...	96,975	44,270	49,375	2,080	1,250

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	8,677	4,649	3,816	121	91
1960[1]	19,635	12,673	6,573	214	175
1965[2]	26,896	17,443	8,806	356	291
1966	28,442	18,130	9,547	395	320
1967	29,241	18,176	10,299	434	332
1968	29,833	18,108	10,910	474	341
1969	29,586	17,209	11,536	488	353
1970	28,613	16,316	11,421	506	370
1971	27,814	15,615	11,271	553	375
1972	28,477	15,808	11,710	574	385
1973	29,147	15,594	12,572	588	393
1974	28,763	14,826	12,930	604	403
1975	28,153	14,537	12,579	606	429
1976	29,510	15,072	13,370	614	454
1977	30,506	15,382	14,016	630	478
1978	32,002	15,878	14,926	689	509
1979	33,612	16,407	15,959	734	512
1980	35,133	16,541	17,324	745	523
1981	36,859	17,124	18,443	781	511
1982	38,742	17,841	19,588	806	507
1983 (est.)...	40,568	18,622	20,565	855	526
1984 (est.)...	42,951	19,577	21,905	916	553

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 6. Research and development performance by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	5,124	1,010	3,630	255	121	108
1960[1]	13,523	1,726	10,509	646	360	282
1965[2]	20,044	3,093	14,185	1,474	629	663
1966	21,846	3,220	15,548	1,715	630	733
1967	23,146	3,396	16,335	1,921	673	771
1968	24,605	3,494	17,429	2,149	719	814
1969	25,631	3,503	18,308	2,225	725	870
1970	26,134	4,079	18,067	2,335	737	916
1971	26,676	4,228	18,320	2,500	716	912
1972	28,477	4,590	19,552	2,630	753	952
1973	30,718	4,762	21,249	2,884	817	1,006
1974	32,864	4,911	22,887	3,023	865	1,178
1975	35,213	5,354	24,187	3,409	987	1,276
1976	39,018	5,769	26,997	3,729	1,147	1,376
1977	42,783	6,012	29,825	4,067	1,384	1,495
1978	48,129	6,811	33,304	4,625	1,717	1,672
1979	54,933	7,417	38,226	5,361	1,935	1,994
1980	62,618	7,632	44,505	6,060	2,246	2,175
1981	71,912	8,425	51,858	6,818	2,486	2,325
1982	80,317	9,141	59,011	7,261	2,479	2,425
1983 (est.) ..	87,678	10,228	64,600	7,675	2,600	2,575
1984 (est.) ..	96,975	10,800	72,000	8,605	2,770	2,800

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	8,677	1,692	6,171	428	203	183
1960[1]	19,635	2,481	15,297	928	517	412
1965[2]	26,896	4,124	19,077	1,965	838	892
1966	28,442	4,183	20,256	2,229	819	955
1967	29,241	4,276	20,725	2,417	848	975
1968	29,833	4,246	21,116	2,612	874	985
1969	29,586	4,065	21,094	2,582	842	1,003
1970	28,613	4,481	19,756	2,564	809	1,003
1971	27,814	4,422	19,081	2,613	749	949
1972	28,477	4,590	19,552	2,630	753	952
1973	29,147	4,559	20,094	2,763	781	950
1974	28,763	4,383	19,889	2,696	772	1,023
1975	28,153	4,344	19,229	2,766	801	1,013
1976	29,510	4,374	20,400	2,828	870	1,038
1977	30,506	4,271	21,297	2,889	983	1,066
1978	32,002	4,530	22,142	3,075	1,142	1,113
1979	33,612	4,537	23,391	3,279	1,184	1,221
1980	35,133	4,296	24,944	3,411	1,265	1,217
1981	36,859	4,321	26,575	3,497	1,275	1,191
1982	38,742	4,379	28,524	3,478	1,188	1,173
1983 (est.) ..	40,568	4,697	29,957	3,526	1,194	1,194
1984 (est.) ..	42,951	4,756	31,944	3,788	1,219	1,244

[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 7. Sources of funds for basic research by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	441	251	153	10	27
1960[1]	1,197	715	342	72	68
1965[2]	2,555	1,809	461	164	121
1966	2,814	1,978	510	197	129
1967	3,056	2,201	492	223	140
1968	3,296	2,336	535	276	149
1969	3,441	2,441	540	238	162
1970	3,549	2,489	528	350	182
1971	3,672	2,529	547	400	196
1972	3,829	2,633	563	415	218
1973	3,946	2,709	605	408	224
1974	4,239	2,912	651	432	244
1975	4,608	3,139	705	478	286
1976	4,977	3,436	769	475	297
1977	5,537	3,823	850	527	337
1978	6,392	4,445	964	605	378
1979	7,257	5,044	1,091	711	411
1980	8,089	5,559	1,265	805	460
1981	9,217	6,236	1,585	909	487
1982	9,886	6,588	1,805	983	510
1983 (est.) ...	10,610	6,970	2,025	1,075	540
1984 (est.) ...	11,850	7,775	2,270	1,220	585

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	742	421	259	17	45
1960[1]	1,729	1,030	497	103	99
1965[2]	3,416	2,415	620	219	162
1966	3,660	2,571	665	256	168
1967	3,853	2,774	622	281	176
1968	4,001	2,837	649	335	180
1969	3,985	2,829	623	346	187
1970	3,895	2,733	578	384	200
1971	3,836	2,644	570	418	204
1972	3,829	2,633	563	415	218
1973	3,766	2,589	573	391	213
1974	3,757	2,589	567	386	215
1975	3,720	2,540	562	388	230
1976	3,770	2,604	581	360	225
1977	3,939	2,718	607	374	240
1978	4,250	2,956	641	402	251
1979	4,438	3,085	667	435	251
1980	4,548	3,128	709	453	258
1981	4,727	3,199	813	466	249
1982	4,749	3,160	872	471	246
1983 (est.) ...	4,886	3,205	938	494	249
1984 (est.) ...	5,229	3,427	1,006	537	259

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[1] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

[2] Data for 1961-64 can be found in *National Patterns of Science and Technology Resources, 1981* (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 8. Basic research performance by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	441	101	151	110	33	46
1960[1]	1,197	160	376	433	97	131
1965[2]	2,555	364	592	1,138	208	253
1966	2,814	385	624	1,303	227	275
1967	3,056	435	629	1,457	250	285
1968	3,296	432	642	1,649	276	297
1969	3,441	532	618	1,711	275	305
1970	3,549	577	602	1,796	269	305
1971	3,672	586	590	1,914	260	322
1972	3,829	625	593	2,022	244	345
1973	3,946	608	631	2,053	297	357
1974	4,239	696	699	2,154	285	405
1975	4,608	734	730	2,410	309	425
1976	4,977	786	819	2,549	359	464
1977	5,537	914	911	2,800	402	510
1978	6,392	1,029	1,035	3,176	567	585
1979	7,257	1,089	1,158	3,612	718	680
1980	8,089	1,182	1,325	4,026	786	770
1981	9,217	1,302	1,641	4,576	863	835
1982	9,886	1,465	1,850	4,851	870	850
1983 (est.) ..	10,610	1,650	2,050	5,135	900	875
1984 (est.) ..	11,850	1,800	2,300	5,850	975	925

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	742	169	256	184	55	78
1960[1]	1,729	230	547	622	139	191
1965[2]	3,416	485	796	1,518	277	340
1966	3,660	500	813	1,693	295	359
1967	3,853	548	796	1,834	315	360
1968	4,001	525	778	2,003	335	360
1969	3,985	617	712	1,985	319	352
1970	3,895	634	659	1,973	295	334
1971	3,836	613	615	2,001	272	335
1972	3,829	625	593	2,022	244	345
1973	3,766	582	597	1,966	284	337
1974	3,757	621	608	1,922	254	352
1975	3,720	595	581	1,955	251	338
1976	3,770	596	619	1,933	272	350
1977	3,939	649	651	1,989	286	364
1978	4,250	684	688	2,112	377	389
1979	4,438	666	708	2,209	439	416
1980	4,548	665	743	2,266	443	431
1981	4,727	668	841	2,347	443	428
1982	4,749	702	894	2,324	417	412
1983 (est.) ..	4,886	758	951	2,358	413	406
1984 (est.) ..	5,229	793	1,021	2,575	429	411

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[1] Data for 1954-59 can be found in National Patterns of R&D Resources, 1953-77 (NSF 77-310).

[2] Data for 1961-64 can be found in National Patterns of Science and Technology Resources, 1981 (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation.

Table 9. Sources of funds for applied research by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	1,279	747	455	57	20
1960[1]	3,020	1,688	1,226	66	40
1965[2]	4,339	2,524	1,654	88	73
1966	4,601	2,582	1,841	89	89
1967	4,780	2,694	1,889	102	95
1968	5,131	2,810	2,125	97	99
1969	5,316	2,785	2,320	105	106
1970	5,720	3,080	2,427	98	115
1971	5,739	3,008	2,494	115	122
1972	5,984	3,104	2,615	140	125
1973	6,597	3,394	2,891	172	140
1974	7,228	3,534	3,332	203	159
1975	7,863	3,940	3,517	224	182
1976	9,046	4,534	4,003	283	226
1977	9,745	4,786	4,410	303	246
1978	10,844	5,229	4,981	354	280
1979	12,372	5,870	5,794	404	304
1980	14,060	6,599	6,695	428	338
1981	16,912	7,473	8,555	513	371
1982	18,444	7,735	9,741	580	388
1983 (est) ...	19,897	8,107	10,710	655	425
1984 (est) ...	21,400	8,380	11,830	720	470

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	2,164	1,260	774	96	34
1960[1]	4,380	2,442	1,785	95	58
1965[2]	5,818	3,379	2,224	117	98
1966	5,989	3,359	2,398	116	116
1967	6,036	3,398	2,390	128	120
1968	6,223	3,411	2,574	118	120
1969	6,139	3,221	2,674	122	122
1970	6,265	3,377	2,654	108	126
1971	5,985	3,141	2,597	120	127
1972	5,984	3,104	2,615	140	125
1973	6,266	3,234	2,734	165	133
1974	6,341	3,124	2,896	181	140
1975	6,297	3,173	2,797	182	145
1976	6,845	3,434	3,025	215	171
1977	6,944	3,405	3,149	215	175
1978	7,211	3,478	3,312	235	186
1979	7,571	3,592	3,546	247	186
1980	7,891	3,709	3,752	241	189
1981	8,668	3,831	4,384	263	190
1982	8,892	3,719	4,708	278	187
1983 (est) ...	9,201	3,738	4,966	301	196
1984 (est) ...	9,474	3,701	5,248	317	208

[1] Data for 1954-59 can be found in National Patterns of R&D Resources, 1953-77 (NSF 77-310).

[2] Data for 1961-64 can be found in National Patterns of Science and Technology Resources, 1981 (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation.

Table 10. Applied research performance by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	1,279	345	726	130	44	34
1960[1]	3,020	595	2,029	179	122	95
1965[2]	4,339	990	2,658	279	204	208
1966	4,601	997	2,843	328	207	226
1967	4,780	1,027	2,915	374	219	245
1968	5,131	1,110	3,124	404	231	262
1969	5,316	1,114	3,287	407	210	298
1970	5,720	1,327	3,427	427	216	323
1971	5,739	1,302	3,415	474	210	338
1972	5,984	1,360	3,514	524	221	365
1973	6,597	1,480	3,825	713	226	353
1974	7,228	1,574	4,288	736	217	413
1975	7,863	1,730	4,570	851	264	448
1976	9,046	2,093	5,112	1,016	327	498
1977	9,745	2,044	5,636	1,067	465	533
1978	10,844	2,192	6,300	1,213	549	590
1979	12,372	2,392	7,225	1,465	560	710
1980	14,060	2,484	8,450	1,691	700	735
1981	16,912	2,732	10,725	1,865	800	790
1982	18,444	2,729	12,100	1,995	795	825
1983 (est) ...	19,897	2,927	13,150	2,095	825	900
1984 (est) ...	21,400	3,000	14,250	2,280	870	1,000

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	2,164	578	1,235	219	74	58
1960[1]	4,380	855	2,954	257	175	139
1965[2]	5,818	1,320	3,575	371	272	280
1966	5,989	1,295	3,704	427	269	294
1967	6,036	1,293	3,687	470	276	310
1968	6,223	1,349	3,785	491	281	317
1969	6,139	1,293	3,787	472	244	343
1970	6,265	1,458	3,747	469	237	354
1971	5,985	1,362	3,556	495	220	352
1972	5,984	1,360	3,514	524	221	365
1973	6,266	1,417	3,617	683	216	333
1974	6,341	1,405	3,726	657	194	359
1975	6,297	1,404	3,633	691	214	355
1976	6,845	1,587	3,863	771	248	376
1977	6,944	1,452	4,024	758	330	380
1978	7,211	1,458	4,189	806	365	393
1979	7,571	1,463	4,422	896	355	435
1980	7,891	1,398	4,736	952	394	411
1981	8,668	1,401	5,496	957	410	404
1982	8,892	1,307	5,849	956	381	399
1983 (est) ...	9,201	1,344	6,098	963	379	417
1984 (est) ...	9,474	1,321	6,322	1,004	383	444

[1] Data for 1954-59 can be found in National Patterns of R&D Resources, 1953-77 (NSF 77-310).

[2] Data for 1961-64 can be found in National Patterns of Science and Technology Resources, 1981 (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation.

Table 11. Sources of funds for development by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	3,404	1,755	1,637	5	7
1960[1]	9,306	6,335	2,948	11	12
1965[2]	13,150	8,679	4,433	15	23
1966	14,431	9,408	4,977	18	28
1967	15,310	9,500	5,761	20	29
1968	16,178	9,782	6,345	17	34
1969	16,874	9,669	7,150	17	38
1970	16,865	9,323	7,489	13	40
1971	17,265	9,427	7,[illegible]31	14	43
1972	18,664	10,071	8,532	19	42
1973	20,175	10,296	9,797	33	49
1974	21,397	10,404	10,895	42	56
1975	22,742	11,030	11,598	47	67
1976	24,995	11,944	12,922	52	77
1977	27,501	12,985	14,369	58	89
1978	30,893	14,202	16,505	78	108
1979	35,304	15,901	19,196	85	122
1980	40,469	17,293	22,951	90	135
1981	45,783	19,693	25,849	101	140
1982	51,987	22,730	28,982	120	155
1983 (est) ...	57,171	25,251	31,615	130	175
1984 (est) ...	63,725	28,115	35,275	140	195

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	5,771	2,968	2,783	8	12
1960[1]	13,526	9,201	4,291	16	18
1965[2]	17,662	11,649	5,962	20	31
1966	18,793	12,250	6,484	23	36
1967	19,352	12,004	7,287	25	36
1968	19,609	11,860	7,687	21	41
1969	19,462	11,159	8,239	20	44
1970	18,453	10,206	8,189	14	44
1971	17,993	9,830	8,104	15	44
1972	18,664	10,071	8,532	19	42
1973	19,115	9,771	9,265	32	47
1974	18,665	9,113	9,467	37	48
1975	18,136	8,824	9,220	38	54
1976	18,895	9,034	9,764	39	58
1977	19,623	9,259	10,260	41	63
1978	20,541	9,444	10,973	52	72
1979	21,603	9,730	11,746	52	75
1980	22,694	9,704	12,863	51	76
1981	23,464	10,094	13,246	52	72
1982	25.101	10,962	14,008	57	74
1983 (est) ...	26,481	11,679	14,661	60	81
1984 (est) ...	28,248	12,449	15,651	62	86

[1] Data for 1954-59 can be found in National Patterns of R&D Resources, 1953-77 (NSF 77-310).

[2] Data for 1961-64 can be found in National Patterns of Science and Technology Resources, 1981 (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation.

Table 12. Development performance by sector: 1953, 1960, and 1965-84

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	3,404	564	2,753	15	44	28
1960[1]	9,306	971	8,104	34	141	56
1965[2]	13,150	1,739	10,935	57	217	202
1966	14,431	1,838	12,081	84	196	232
1967	15,310	1,934	12,841	90	204	241
1968	16,178	1,952	13,663	96	212	255
1969	16,874	1,857	14,403	107	240	267
1970	16,865	2,175	14,038	112	252	288
1971	17,265	2,340	14,315	112	246	252
1972	18,664	2,605	15,445	84	288	242
1973	20,175	2,674	16,793	118	294	296
1974	21,397	2,641	17,900	133	363	360
1975	22,742	2,890	18,887	148	414	403
1976	24,995	2,890	21,066	164	461	414
1977	27,501	3,054	23,278	200	517	452
1978	30,893	3,590	25,969	236	601	497
1979	35,304	3,936	29,843	284	637	604
1980	40,469	3,966	34,730	343	760	670
1981	45,783	4,391	39,492	377	823	700
1982	51,987	4,947	45,061	415	814	750
1983 (est) ...	57,171	5,651	49,400	445	875	800
1984 (est) ...	63,725	6,000	55,450	475	925	875

Constant dollars[3]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	5,771	945	4,680	25	74	47
1960[1]	13,526	1,396	11,796	49	203	82
1965[2]	17,662	2,319	14,706	76	289	272
1966	18,793	2,388	15,739	109	255	302
1967	19,352	2,435	16,242	113	257	305
1968	19,609	2,372	16,553	118	258	308
1969	19,462	2,155	16,595	125	279	308
1970	18,453	2,389	15,350	122	277	315
1971	17,993	2,447	14,910	117	257	262
1972	18,664	2,605	15,445	84	288	242
1973	19,115	2,560	15,880	114	281	280
1974	18,665	2,357	15,555	117	324	312
1975	18,136	2,345	15,015	120	336	320
1976	18,895	2,191	15,918	124	350	312
1977	19,623	2,170	16,622	142	367	322
1978	20,541	2,388	17,265	157	400	331
1979	21,603	2,408	18,261	174	390	370
1980	22,694	2,233	19,465	193	428	375
1981	23,464	2,252	20,238	193	422	359
1982	25,101	2,370	21,781	198	390	362
1983 (est) ...	26,481	2,595	22,908	205	402	371
1984 (est) ...	28,248	2,642	24,601	209	407	389

[1] Data for 1954-59 can be found in National Patterns of R&D Resources, 1953-77 (NSF 77-310).

[2] Data for 1961-64 can be found in National Patterns of Science and Technology Resources, 1981 (NSF 81-311).

[3] Based on GNP implicit price deflator.

SOURCE: National Science Foundation.

Table 13. Trends in Federal and non-Federal R&D outlays: 1953 and 1960-84

[Percents]

Year	Total	Federal		Civilian related	Non-Federal
		Defense related	Space related		
1953	54	48	1	5	46
1960	65	52	3	9	35
1961	65	50	6	9	35
1962	64	48	7	9	36
1963	66	41	14	11	34
1964	66	37	19	9	34
1965	65	33	21	11	35
1966	64	33	19	12	36
1967	62	35	14	13	38
1968	61	35	13	13	39
1969	58	34	11	13	42
1970	57	33	10	14	43
1971	56	32	9	15	44
1972	56	32	9	15	44
1973	53	30	8	15	47
1974	51	27	8	16	49
1975	51	26	8	17	49
1976	51	26	8	17	49
1977	50	25	8	17	50
1978	50	24	7	19	50
1979	49	23	7	19	51
1980	47	22	7	18	53
1981	46	23	7	16	54
1982	46	25	7	14	54
1983 (est.)	46	27	6	13	54
1984 (est.)	46	29	6	11	54

NOTE: Detail may not add to 100 because of rounding.

SOURCE: National Science Foundation

Table 14. Full-time-equivalent (FTE) scientists and engineers employed in research and development by sector: selected years[1]

[In thousands]

Sector	1954	1961	1965	1969	1972	1975	1977	1978	1979	1980	1981	1982[2]	1983[2]
Total	237.1	425.7	494.5	555.2	518.3	532.7	568.2	594.2	622.0	658.7	691.4	723.0	750.0
Federal Government[3]	37.7	51.1	61.8	68.5	64.4	63.4	62.2	64.3	64.6	65.6	66.0	66.0	66.0
Industry[4,5]	164.1	312.0	348.4	385.6	353.9	363.8	393.6	414.2	437.2	469.2	499.7	530.6	555.9
Universities and colleges, total	25.0	42.4	53.4	68.3	66.5	69.8	74.4	76.6	78.6	81.2	83.3	84.0	85.8
Scientists and engineers	20.3	33.6	40.4	50.4	48.9	51.2	54.4	56.0	56.9	57.9	58.9	59.5	60.3
Graduate students[6]	4.7	8.8	13.0	17.9	17.6	18.6	20.0	20.6	21.7	23.3	24.4	24.5	25.5
University-associated FFRDC's, total	5.0	9.1	11.1	11.6	11.7	12.7	14.0	14.1	14.1	15.2	15.4	15.4	15.3
Scientists and engineers	4.9	8.8	10.7	11.1	11.3	12.3	13.6	13.7	13.7	14.8	15.0	15.0	14.9
Graduate students[6]	.1	.3	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4
Other nonprofit institutions[4]	5.3	11.1	19.9	21.2	21.8	23.0	24.0	25.0	27.5	27.5	27.0	27.0	27.0

[1] Number of full-time employees plus the FTE of part-time employees. Excludes scientists and engineers employed in State and local government agencies. Totals may be understated by about 5 percent because of incomplete data on summer employment at universities and colleges.

[2] Estimate.

[3] Includes both civilian and military service personnel and managers of R&D.

[4] Includes professional R&D personnel employed at FFRDC's administered by organization in the sector.

[5] Excludes social scientists.

[6] Numbers of FTE graduate students receiving stipends and engaged in R&D.

NOTE: The figures for the industry sector represent yearly averages and may differ from other data in the text which is based upon surveys reporting the employment in a single month of the year.

SOURCE: National Science Foundation

Table 15. National expenditures for performance of R&D as a percent of gross national product (GNP) by source: 1961-84

Year	Total	Federal	Non-Federal
1961	2.73	1.76	.97
1962	2.72	1.75	.97
1963	2.86	1.88	.96
1964	2.96	1.97	.99
1965	2.90	1.88	1.02
1966	2.89	1.85	1.04
1967	2.89	1.80	1.09
1968	2.82	1.71	1.11
1969	2.72	1.58	1.14
1970	2.63	1.50	1.13
1971	2.48	1.39	1.09
1972	2.40	1.33	1.07
1973	2.32	1.24	1.08
1974	2.29	1.17	1.12
1975	2.27	1.17	1.10
1976	2.27	1.16	1.11
1977	2.23	1.13	1.10
1978	2.22	1.10	1.12
1979	2.27	1.11	1.16
1980	2.38	1.12	1.26
1981	2.43	1.13	1.30
1982	2.61	1.21	1.40
1983 (est.)	2.65	1.22	1.43
1984 (est.)	2.66	1.22	1.44

SOURCES: National Science Foundation and Department of Commerce

Table 16. R&D scientists and engineers and employed civilian labor force: selected years

[In thousands]

Year	R&D scientists and engineers	Employed civilian labor force
1967	530.0	74,372
1969	555.2	77,902
1971	527.1	79,367
1973	518.4	85,064
1975	532.7	85,846
1977	568.2	92,017
1979	622.0	98,824
1981	691.4	100,397
1983 (est.)	750.0	100,834

SOURCES: National Science Foundation and Department of Labor

Table 17. National expenditures for performance of R&D as a percent of gross national product (GNP) by country: 1967-82

Year	France	West Germany	Japan	United Kingdom	United States	U.S.S.R.
1967	2.13	1.97	1.52	2.29	2.89	2.91
1968	2.08	1.97	1.60	2.25	2.82	NA
1969	1.94	2.05	1.64	2.22	2.72	3.03
1970	1.91	2.18	1.81	NA	2.63	3.23
1971	1.90	2.38	1.85	NA	2.48	3.29
1972	1.86	2.33	1.86	2.05	2.40	3.58
1973	1.76	2.22	1.90	NA	2.32	3.66
1974	1.79	2.26	1.97	NA	2.29	3.54
1975	1.80	2.38	1.96	2.05	2.27	3.69
1976	1.77	2.29	1.95	NA	2.27	3.55
1977	1.76	2.31	1.93	NA	2.23	3.46
1978	1.76	2.31	1.96	2.13	2.22	3.47
1979	1.81	2.59	2.06	2.20	2.27	3.44
1980	1.85	2.65	2.18	NA	2.38	3.51
1981	1.97	2.68	2.36	NA	2.43	3.53
1982	NA	NA	NA	NA	2.61	NA

NA = Not available.

SOURCES: National Science Foundation, Organization for Economic Cooperation and Development and Dr. Robert Campbell (Indiana University)

Table 18. Scientists and engineers[1] engaged in R&D per 10,000 labor force population by country: 1967-82

Year	France	West Germany	Japan	United Kingdom	United States	U.S.S.R.	
						Low estimate	High estimate
1967	25.3	24.9	27.8	NA	67.2	50.7	55.3
1968	26.4	26.2	31.2	20.8	68.0	53.5	58.8
1969	27.2	28.4	30.8	NA	66.9	56.5	62.1
1970	27.3	30.9	33.4	NA	64.4	58.4	64.2
1971	27.8	33.8	37.5	NA	61.0	63.0	69.1
1972	28.1	36.0	38.1	30.4	58.3	66.5	73.2
1973	28.4	37.8	42.5	NA	56.8	71.2	79.2
1974	28.8	39.1	44.9	NA	56.1	74.5	82.9
1975	29.3	41.0	47.9	31.2	55.8	78.2	87.5
1976	29.9	41.7	48.4	NA	55.8	79.8	89.4
1977	30.0	44.3	49.9	NA	56.4	81.0	91.0
1978	31.0	NA	49.4	33.2	57.2	82.8	93.4
1979	31.6	47.7	50.4	NA	58.4	84.5	95.6
1980	NA	NA	53.6	NA	60.7	86.3	98.0
1981	NA	NA	55.6	NA	62.7	NA	NA
1982	NA	NA	NA	NA	64.6	NA	NA

[1] Includes all scientists and engineers engaged in R&D on a full-time-equivalent basis (except Japan whose data include persons primarily employed in R&D and the United Kingdom whose data include only the government and industry sectors).

NA = Not available.

SOURCES: National Science Foundation, U.S. Department of Labor, Organization for Economic Cooperation and Development, and Dr. Robert Campbell (Indiana University)

Table 19. Estimated ratio of civilian R&D expenditures[1] to gross national product (GNP) for selected countries: 1967-82

Year	France	West Germany	Japan	United Kingdom	United States
1967	NA	NA	1.51	NA	1.88
1968	NA	1.80	1.59	NA	1.83
1969	NA	1.87	1.63	NA	1.79
1970	NA	2.01	1.79	NA	1.76
1971	1.46	2.25	1.84	NA	1.68
1972	1.47	2.20	1.84	1.50	1.63
1973	1.39	2.07	1.89	NA	1.62
1974	1.43	2.12	1.96	NA	1.67
1975	1.46	2.24	1.95	1.41	1.68
1976	1.44	2.15	1.94	NA	1.72
1977	1.44	2.18	1.92	NA	1.67
1978	1.41	2.18	1.94	1.52	1.69
1979	1.43	2.46	2.05	NA	1.75
1980	1.42	2.53	2.15	NA	1.86
1981	NA	2.58	2.34	NA	1.87
1982	NA	NA	NA	NA	1.96

[1] National R&D expenditures, excluding government funds for defense.

NA = Not available.

SOURCES: National Science Foundation and Organization for Economic Cooperation and Development

TABLE 20. FEDERAL OUTLAYS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT, BY AGENCY: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

AGENCY	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES 1983	ESTIMATES 1984
TOTAL, ALL AGENCIES ..	19,550,839	21,020,862	22,882,939	25,127,905	27,040,965	30,635,823	34,065,853	35,766,775	39,584,824	45,316,033
DEPT OF AGRIC, TOTAL .	425,641	468,843	537,766	572,359	630,474	687,556	782,458	828,413	872,771	869,832
AGRIC RESEARCH SERVICE 1/	232,781	247,441	294,580	318,401	331,158	371,576	425,913	436,075	464,157	470,272
COOPERATIVE STATE RSCH SERVICE 2/ .	95,579	104,196	120,158	134,850	156,593	174,245	198,992	219,846	230,438	232,322
FOREST SERVICE	72,488	90,277	92,533	86,708	105,700	100,561	101,845	115,969	108,228	101,069
OTHER AGRICULTURE ..	24,793	26,929	30,495	32,400	37,023	41,174	55,708	56,523	69,948	66,169
DEPT OF COMMERCE,TOTAL	224,592	233,316	238,188	272,678	307,094	360,640	346,792	286,460	325,260	251,284
NATIONAL BUREAU OF STANDARDS	47,165	49,107	53,128	59,002	64,758	77,129	84,372	87,609	95,515	82,494
NATIONAL OCEANIC & ATMOS ADMIN	127,689	134,457	132,609	164,733	190,110	210,583	208,969	174,100	200,980	153,300
OTHER COMMERCE	49,738	49,752	52,451	48,943	52,226	72,928	53,451	24,751	28,765	14,990
DEPT OF DEFENSE, TOTAL	9,363,517	9,445,510	10,307,977	10,935,419	11,733,102	13,706,133	15,993,018	18,482,948	22,248,415	27,214,755
ARMY	2,083,044	1,969,575	2,195,044	2,464,318	2,536,219	2,852,886	3,123,711	3,414,351	3,855,815	4,560,655
NAVY	3,126,263	3,320,098	3,582,569	3,919,368	3,926,432	4,507,858	4,916,911	5,394,737	6,082,000	7,336,200
AIR FORCE	3,567,555	3,625,220	3,902,173	3,969,911	4,427,950	5,323,563	6,756,612	8,209,104	10,317,600	12,746,100
DEFENSE AGENCIES ...	556,858	507,500	610,460	555,057	814,181	981,435	1,160,041	1,419,975	1,943,200	2,518,800
OTHER DOD	29,797	23,117	17,731	26,765	28,320	40,391	35,743	44,781	49,800	53,000
DEPT OF EDUCATION	N/A	N/A	N/A	N/A	136,476	120,910	111,824	150,059	173,581	161,111
DEPT OF ENERGY	N/A	N/A	3,593,121	4,413,005	4,956,800	5,660,248	6,125,884	5,785,412	5,987,038	5,681,013
DEPT OF HEALTH & HUMAN SVCS, TOTAL 3/ ..	2,168,201	2,615,030	2,622,223	3,070,235	3,172,700	3,554,091	3,997,524	4,052,072	4,323,243	4,414,218
NAT'L INST OF HEALTH	1,684,363	2,118,384	2,104,983	2,507,105	2,713,447	3,029,267	3,392,200	3,475,000	3,758,567	3,838,045
OTHER HHS	483,838	496,646	517,240	563,130	459.253	524,824	605,324	577,072	564,676	576,173
DEPT OF HOUSING & URBAN DEV	58,737	60,274	68,981	59,269	74,324	65,785	54,078	37,035	34,667	31,172
DEPT OF THE INTERIOR, TOTAL	265,994	319,748	303,953	339,932	404,277	431,486	436,935	394,920	431,144	358,788
BUREAU OF MINES	82,681	113,700	103,675	104,180	121,378	130,802	109,000	105,181	119,846	81,750
GEOLOGICAL SURVEY ..	95,176	115,664	112,205	128,711	144,157	145,168	168,197	150,070	166,792	144,560
OTHER INTERIOR	88,137	90,384	88,073	107,041	138,742	155,516	159,738	139,669	144,506	132,478
DEPT OF JUSTICE	43,809	39,918	33,709	33,457	45,878	45,320	26,093	36,581	36,052	26,355
DEPT OF LABOR	25,358	27,814	28,062	97,629	109,170	137,733	61,616	29,431	18,814	18,224
DEPT OF STATE	28,639	27,034	44,065	57,486	3,168	2,206	1,766	1,549	1,596	1,608
DEPT OF TRANS, TOTAL .	339,191	335,700	363,504	377,250	372,362	390,969	432,092	359,950	380,301	470,360
FED'L AVIATION ADMIN	113,681	114,600	102,800	100,200	111,400	109,700	125,900	110,900	133,200	250,500
OTHER TRANS	225,510	221,100	260,704	277,050	260,962	281,269	306,192	249,050	247,101	219,860
DEPT OF THE TREASURY .	1,689	3,842	5,015	9,901	9,581	10,900	10,826	13,644	16,438	16,496
OTHER AGENCIES										
AGENCY FOR INTERNAT'L DEVELOPMENT 4/	N/A	N/A	N/A	N/A	80,305	114,330	166,118	188,593	253,332	259,319
ENERGY RESEARCH & DEVELOPMENT ADMIN .	2,246,625	2,553,700	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ENVIRONMENTAL PROTECTION AGENCY ..	218,567	265,620	282,950	312,514	388,867	384,700	344,300	336,200	295,200	249,800
NAT'L AERONAUTICS & SPACE ADMIN	3,266,491	3,669,022	3,449,130	3,432,130	3,395,219	3,605,729	3,705,533	3,252,901	2,646,100	3,600,300
NAT'L SCI FOUNDATION .	600,400	669,100	[illegible]4,700	738,566	804,561	848,200	905,000	1,015,105	1,004,072	1,145,274
NUCLEAR REGULATORY COMMISSION	58,458	76,879	107,823	131,690	145,422	182,752	215,960	208,612	205,519	199,740
VETERANS ADMIN	97,026	109,504	112,822	123,931	123,128	138,600	144,300	140,681	174,458	165,195
ALL OTHER AGENCIES ...	117,904	100,008	108,950	150,454	148,057	187,527	203,736	166,209	156,823	181,189

1/ INCLUDES THE FORMER AGRICULTURE RESEARCH SERVICE OF THE SCIENCE AND EDUCATION ADMINISTRATION FOR FISCAL YEARS 1978-80.

2/ INCLUDES THE FORMER COOPERATIVE STATE RESEARCH SERVICE OF THE SCIENCE AND EDUCATION ADMINISTRATION FOR FISCAL YEARS 1978-80.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE AMOUNTS.

4/ INCLUDES PROGRAMS OF THE INTERNATIONAL DEVELOPMENT COOPERATION AGENCY FOR FISCAL YEARS 1979-81.

NOTE: N/A (NOT APPLICABLE) INDICATES THAT THE AGENCY OR AGENCY SUBDIVISION DID NOT EXIST AS SUCH OR IN THAT ORGANIZATION IN THAT YEAR.

SOURCE: NATIONAL SCIENCE FOUNDATION

BEST COPY AVAILABLE

TABLE 21. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY AGENCY: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

AGENCY	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL, ALL AGENCIES ..	19,038,818	20,779,658	23,450,377	25,845,137	28,145,142	29,830,432	33,103,924	36,432,589	38,710,072	45,496,998
DEPT OF AGRIC, TOTAL .	420,082	462,449	546,963	621,282	663,025	687,586	773,958	797,274	852,868	848,358
AGRIC RESEARCH SERVICE 1/	217,124	242,111	298,946	325,541	345,836	351,811	394,085	404,928	444,988	456,318
COOPERATIVE STATE RSCH SERVICE 2/ .	101,141	113,389	127,265	157,424	172,557	184,205	199,383	219,032	234,949	221,715
FOREST SERVICE	78,181	79,901	90,262	105,617	107,500	111,531	126,055	112,145	105,021	100,766
OTHER AGRICULTURE ..	23,636	27,048	30,490	32,700	37,132	40,039	54,435	61,169	67,910	69,559
DEPT OF COMMERCE,TOTAL	215,382	228,853	244,721	283,665	309,359	342,549	327,925	336,278	338,617	234,261
NATIONAL BUREAU OF STANDARDS	43,156	47,444	53,223	58,306	67,800	76,167	82,518	88,837	93,609	77,951
NATIONAL OCEANIC & ATMOS ADMIN	128,017	135,094	145,692	161,450	171,176	199,750	201,351	222,026	220,523	142,120
OTHER COMMERCE	44,209	46,315	45,806	63,909	70,383	66,632	44,056	25,415	24,485	14,190
DEPT OF DEFENSE, TOTAL	9,012,472	9,654,722	10,963,351	11,553,638	12,506,225	13,981,012	16,508,649	20,622,574	23,125,122	29,735,527
ARMY	1,896,742	2,013,653	2,441,866	2,548,927	2,768,674	2,979,987	3,244,159	3,760,489	3,965,015	4,904,113
NAVY	3,100,165	3,328,005	3,817,410	3,998,416	4,335,042	4,706,132	5,005,952	5,845,056	6,043,681	8,063,335
AIR FORCE	3,513,495	3,726,627	4,031,095	4,262,349	4,525,616	5,211,029	6,969,247	9,357,858	10,937,300	13,863,958
DEFENSE AGENCIES ...	476,537	561,647	641,441	707,886	847,583	1,045,984	1,248,240	1,618,134	2,115,279	2,847,783
OTHER DOD	25,533	24,790	31,539	36,060	29,310	37,880	41,051	41,037	63,847	56,338
DEPT OF EDUCATION	N/A	N/A	N/A	N/A	166,288	139,372	104,862	127,981	145,366	126,251
DEPT OF ENERGY	N/A	N/A	3,536,220	4,244,827	4,638,766	4,753,688	4,918,225	4,708,158	4,605,420	4,516,840
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/ .	2,397,458	2,583,563	2,823,297	3,207,254	3,504,880	3,780,221	3,927,141	3,940,745	4,326,704	4,434,797
NAT'L INST OF HEALTH	1,879,872	2,060,247	2,279,859	2,580,862	2,953,133	3,181,830	3,333,249	3,433,148	3,773,664	3,853,186
OTHER HHS	517,586	523,316	543,438	626,392	551,747	598,391	593,892	507,597	553,040	581,611
DEPT OF HOUSING & URBAN DEV	62,028	67,575	52,104	69,723	67,915	56,025	48,108	28,855	31,942	27,172
DEPT OF THE INTERIOR, TOTAL	303,329	333,198	314,682	358,974	405,778	411,258	427,105	381,074	397,143	327,790
BUREAU OF MINES	107,627	131,300	101,914	113,968	121,004	113,373	96,744	94,707	104,669	67,905
GEOLOGICAL SURVEY ..	106,616	110,324	117,468	133,656	145,571	146,339	169,777	152,560	150,290	136,037
OTHER INTERIOR	89,086	91,574	95,300	111,350	139,203	151,546	160,584	133,807	142,184	123,848
DEPT OF JUSTICE	44,330	33,859	27,650	60,919	42,991	41,501	26,527	26,692	35,364	23,726
DEPT OF LABOR.........	25,376	28,533	29,565	97,835	136,977	138,053	62,188	25,410	18,017	19,595
DEPT OF STATE	27,890	39,374	61,406	85,208	3,168	2,206	1,766	1,549	1,596	1,608
DEPT OF TRANS, TOTAL .	311,563	294,500	354,604	408,250	370,089	361,230	415,539	310,083	394,456	519,956
FED'L AVIATION ADMIN	105,578	98,100	103,400	110,500	110,500	103,100	120,000	94,300	142,600	303,900
OTHER TRANSPORTATION	205,985	196,400	251,204	297,750	259,589	258,130	295,539	215,783	251,856	216,056
DEP[illegible] THE TREASURY .	1,665	3,735	4,805	9,878	9,541	12,033	11,306	13,323	16,109	16,426
OTHER AGENCIES										
AGENCY FOR INTERNAT'L DEVELOPMENT 4/......	N/A	N/A	N/A	N/A	106,472	149,322	134,230	199,911	175,186	206,502
ENERGY RESEARCH & DEVELOPMENT ADMIN..	2,047,306	2,463,809	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ENVIRONMENTAL PROTECTION AGENCY...	257,657	259,138	295,450	384,636	410,100	345,000	325,700	335,089	240,794	207,731
NAT'L AERONAUTICS & SPACE ADMIN.........	3,064,413	3,446,830	3,170,789	3,333,260	3,578,404	3,234,088	3,593,155	3,077,859	2,415,950	2,462,500
NAT'L SCI FOUNDATION .	595,021	609,256	697,019	748,775	807,925	881,792	961,564	975,327	1,060,200	1,240,465
NUCLEAR REGULATORY COMMISSION	64,155	88,432	112,291	133,891	148,772	182,672	219,667	220,287	209,500	199,740
SMITHSONIAN INST	24,785	25,735	29,651	34,896	36,901	41,006	44,861	52,357	55,749	63,618
TENN VALLEY AUTHORITY	16,567	18,713	26,475	31,467	38,388	80,100	68,900	85,000	74,900	78,300
VETERANS ADMIN	94,807	97,679	107,001	113,991	127,004	133,400	144,400	137,300	162,700	159,800
ALL OTHER AGENCIES ...	52,532	39,705	52,333	62,768	66,174	76,318	58,148	29,463	26,369	46,035

1/ INCLUDES THE FORMER AGRICULTURE RESEARCH SERVICE OF THE SCIENCE AND EDUCATION ADMINISTRATION FOR FISCAL YEARS 1978-80.

2/ INCLUDES THE FORMER COOPERATIVE STATE RESEARCH SERVICE OF THE SCIENCE AND EDUCATION ADMINISTRATION FOR FISCAL YEARS 1978-80.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE AMOUNTS.

4/ INCLUDES PROGRAMS OF THE INTERNATIONAL DEVELOPMENT COOPERATION AGENCY FOR FISCAL YEARS 1979-81.

NOTE: N/A (NOT APPLICABLE) INDICATES THAT THE AGENCY OR AGENCY SUBDIVISION DID NOT EXIST AS SUCH OR IN THAT ORGANIZATION IN THAT YEAR.

SOURCE: NATIONAL SCIENCE FOUNDATION

Table 22. Federal R&D funding by budget function:[1] fiscal years 1974-84

[Dollars in millions]

Function	Actual									Estimates	
	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Total	$17,410	$19,039	$20,780	$23,542	$25,999	$28,080	$30,017	$33,319	$36,115	$38,455	$45,663
National defense	9,016	9,679	10,430	11,864	12,899	13,791	14,946	18,413	22,070	24,913	31,984
Health	2,069	2,170	2,351	2,629	2,968	3,401	3,694	3,871	3,869	4,249	4,356
Energy	759	1,363	1,649	2,562	3,134	3,461	3,603	3,501	3,012	2,580	2,306
Space research and technology	2,702	2,764	3,130	2,924	2,962	3,009	2,981	2,696	2,584	1,883	1,897
General science	749	813	858	974	1,050	1,119	1,233	1,340	1,359	1,492	1,720
Transportation	693	635	631	708	768	798	888	870	791	894	1,091
Natural resources and environment	516	624	683	753	904	1,010	999	1,061	965	927	788
Agriculture	313	342	383	457	501	552	585	659	693	747	748
Education, training, employment, and social services	236	239	255	230	345	354	468	298	228	220	226
International affairs	24	29	42	66	57	117	127	160	165	152	161
Veterans benefits and services	85	95	98	107	111	123	126	143	139	158	159
Commerce and housing credit	51	65	69	71	77	93	102	106	104	107	91
Income security	71	72	48	55	67	57	77	43	32	42	43
Administration of justice	35	44	35	30	44	47	45	34	31	33	42
Community and regional development	82	93	109	101	92	127	119	104	63	48	39
General government	9	12	12	13	20	23	22	22	10	10	12

[1] Listed in descending order of 1984 budget authority. Data for 1974-77 are shown in obligations; data for 1978-84 are shown in budget authority. Data for 1983 and 1984 are estimates as shown in the 1984 budget published in January 1983.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

TABLE 23. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT BY CHARACTER OF WORK, AND R&D PLANT: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

FISCAL YEAR	TOTAL	RESEARCH		DEVELOPMENT	R&D PLANT
		BASIC	APPLIED		
1975	19,859,548	2,588,427	4,141,281	12,309,110	820,730
1976	21,616,382	2,767,454	4,851,878	13,160,326	836,724
1977	24,817,577	3,258,640	5,255,475	14,936,262	1,367,200
1978	27,140,849	3,698,604	5,908,154	16,238,379	1,295,712
1979	29,620,597	4,192,665	6,342,340	17,610,137	1,475,455
1980	31,386,095	4,674,156	6,923,222	18,233,054	1,555,663
1981	34,589,634	5,041,295	7,171,485	20,891,144	1,485,710
1982	37,822,363	5,481,605	7,540,580	23,410,404	1,389,774
1983 (ESTIMATED)	40,079,366	6,086,013	8,068,315	24,555,744	1,369,294
1984 (ESTIMATED)	47,063,560	6,615,380	8,047,859	30,833,759	1,566,562

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 24. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY PERFORMER: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

PERFORMER	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL	19,038,818	20,779,658	23,450,377	25,845,137	28,145,142	29,830,432	33,103,924	36,432,589	38,710,072	45,496,998
FEDERAL INTRAMURAL 1/.	5,353,962	5,768,719	6,011,680	6,810,422	7,417,528	7,632,333	8,425,745	9,141,030	10,228,271	10,969,936
INDUSTRIAL FIRMS EXCL FFRDC'S	8,423,242	9,340,294	10,717,226	11,399,984	12,172,401	12,969,145	14,867,893	17,192,224	17,729,250	22,957,429
FFRDC'S ADMIN BY INDUSTRIAL FIRMS ...	703,652	813,844	1,112,720	1,242,482	1,318,096	1,408,062	1,413,894	1,506,426	1,525,062	1,614,440
UNIV & COLLEGES EXCL FFRDC'S	2,411,432	2,551,801	2,905,475	3,374,631	3,888,844	4,263,432	4,465,755	4,605,472	4,996,105	5,270,704
FFRDC'S ADMIN BY UNIV & COLLEGES	935,076	1,061,115	1,313,148	1,311,945	1,488,266	1,533,309	1,790,977	1,976,671	2,088,899	2,291,853
NONPROFIT INST EXCL FFRDC'S	702,342	708,583	800,024	998,178	1,026,490	1,105,568	1,068,781	1,091,651	1,176,670	1,335,546
FFRDC'S ADMIN BY NONPROFIT INST	219,918	231,038	263,875	315,917	368,734	441,836	525,231	520,573	568,137	683,196
STATE AND LOCAL GOV ..	227,618	231,165	238,044	268,410	310,121	265,542	222,211	184,265	210,037	189,080
FOREIGN	61,576	73,099	88,185	123,168	154,662	211,205	323,437	214,277	187,641	184,814

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

NOTE: FFRDC'S - FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 25. FEDERAL OBLIGATIONS FOR RESEARCH BY AGENCY: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

AGENCY	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES 1983	ESTIMATES 1984
TOTAL, ALL AGENCIES ..	6,729,708	7,619,332	8,514,115	9,606,758	10,535,005	11,597,378	12,212,780	13,022,185	14,154,328	14,663,239
DEPT OF AGRICULTURE ..	401,944	442,224	524,020	594,484	631,920	657,435	740,984	766,463	822,465	818,898
DEPT OF COMMERCE	144,420	155,713	176,129	192,775	219,458	254,433	249,375	276,055	280,127	199,693
DEPT OF DEFENSE, TOTAL	1,431,007	1,527,481	1,715,845	1,824,058	2,014,098	2,261,769	2,600,900	2,952,821	3,161,524	3,572,179
ARMY	336,372	362,395	397,993	409,810	448,610	479,255	536,455	639,223	652,949	745,913
NAVY	406,491	437,950	497,362	526,317	567,315	611,100	698,000	778,700	821,900	883,000
AIR FORCE	355,842	382,302	425,775	448,745	492,253	537,300	617,300	633,900	656,600	732,600
DEFENSE AGENCIES ...	330,634	344,134	393,415	431,686	505,920	634,114	749,145	900,998	1,030,075	1,210,666
OTHER DOD	1,668	700	1,300	7,500	-	-	-	-	-	-
DEPT OF EDUCATION	N/A	N/A	N/A	N/A	93,392	87,575	53,788	70,467	78,094	71,189
DEPT OF ENERGY	N/A	N/A	891,266	1,102,243	1,131,846	1,277,326	1,413,605	1,696,088	1,968,600	1,830,608
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 1/ .	1,924,830	2,150,733	2,414,280	2,740,717	3,015,669	3,332,777	3,492,241	3,605,584	3,972,742	4,093,698
NAT'L INST OF HEALTH	1,604,217	1,767,692	1,968,658	2,232,596	2,530,111	2,787,470	2,948,309	3,124,452	3,443,324	3,522,808
OTHER HHS	320,613	383,041	445,622	508,121	485,558	545,307	543,932	481,132	529,418	570,890
DEPT OF HOUSING & URBAN DEVELOPMENT...	33,495	36,945	32,720	30,535	23,770	19,601	16,690	10,310	11,936	10,089
DEPT OF THE INTERIOR .	234,053	259,458	255,942	283,492	339,468	354,446	369,837	351,460	368,760	310,448
DEPT OF JUSTICE	18,895	18,317	17,584	45,722	28,846	28,760	19,503	16,305	21,829	14,445
DEPT OF LABOR	15,278	18,000	18,727	25,711	42,082	36,432	58,197	17,155	15,869	17,270
DEPT OF STATE	22,458	25,128	38,270	49,126	2,694	1,956	1,606	1,549	1,596	1,608
DEPT OF TRANSPORTATION	53,844	31,100	51,760	66,500	66,983	82,445	88,589	66,685	78,597	81,186
DEPT OF THE TREASURY .	400	1,474	2,140	4,114	4,718	5,687	5,219	8,145	11,245	11,645
OTHER AGENCIES										
AGENCY FOR INTERNAT'L DEVELOPMENT 2/......	N/A	N/A	N/A	N/A	66,886	79,664	86,400	127,904	117,287	140,645
ENERGY RESEARCH & DEVELOPMENT ADMIN...	593,431	746,499	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ENVIRONMENTAL PROTECTION AGENCY ..	141,711	155,395	205,252	252,670	259,000	245,100	218,300	243,379	173,894	148,631
NAT'L AERONAUTICS & SPACE ADMIN	935,139	1,222,841	1,206,076	1,345,167	1,451,236	1,609,644	1,407,158	1,407,140	1,561,535	1,646,880
NAT'L SCI FOUNDATION .	570,015	595,776	688,300	743,502	800,025	873,687	955,464	973,165	1,060,200	1,240,465
NUCLEAR REGULATORY COMMISSION	64,155	88,432	112,291	133,891	148,772	182,672	219,667	220,287	209,500	199,740
SMITHSONIAN INST	24,785	25,735	29,651	34,896	36,901	41,006	44,861	52,357	55,749	63,618
VETERANS ADMIN	87,140	85,127	92,342	99,400	111,362	117,900	127,700	123,000	146,400	143,300
ALL OTHER AGENCIES ...	32,708	32,954	41,520	37,755	45,879	47,063	42,696	35,866	34,379	47,004

1/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES HAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE AMOUNTS.

2/ INCLUDES PROGRAMS OF THE INTERNATIONAL DEVELOPMENT COOPERATION AGENCY FOR FISCAL YEARS 1979-81.

NOTE: N/A (NOT APPLICABLE) INDICATES THAT THE AGENCY OR AGENCY SUBDIVISION DID NOT EXIST AS SUCH OR IN THAT ORGANIZATION IN THAT YEAR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 26. FEDERAL OBLIGATIONS FOR RESEARCH BY PERFORMER: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

PERFORMER	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES 1983	ESTIMATES 1984
TOTAL	6,729,708	7,619,332	8,514,115	9,606,758	10,535,005	11,597,378	12,212,780	13,022,185	14,154,328	14,663,239
FEDERAL INTRAMURAL 1/.	2,463,780	2,879,166	2,957,666	3,220,762	3,481,232	3,666,272	4,034,199	4,194,205	4,576,967	4,636,576
INDUSTRIAL FIRMS EXCL FFRDC'S	1,010,246	1,102,954	1,367,256	1,651,406	1,761,951	2,077,605	1,958,306	2,156,575	2,339,958	2,426,555
FFRDC'S ADMIN BY INDUSTRIAL FIRMS ...	135,701	176,509	192,169	235,173	244,980	311,031	351,344	487,348	515,102	502,002
UNIV & COLLEGES EXCL FFRDC'S	2,078,766	2,249,735	2,583,507	2,928,039	3,333,375	3,699,071	3,920,144	4,045,437	4,407,536	4,667,045
FFRDC'S ADMIN BY UNIV & COLLEGES	425,512	548,278	670,304	714,850	800,601	851,155	940,602	1,056,701	1,165,280	1,286,818
NONPROFIT INST EXCL FFRDC'S	394,676	435,434	512,163	590,851	622,643	678,446	705,197	743,534	804,382	785,912
FFRDC'S ADMIN BY NONPROFIT INST	64,816	57,498	55,552	66,926	73,352	71,719	67,704	104,154	83,840	96,135
STATE AND LOCAL GOV ..	111,907	119,371	115,177	128,827	139,466	150,932	129,312	125,906	144,568	139,695
FOREIGN	44,304	50,387	60,321	69,924	77,405	91,147	105,972	108,325	116,695	122,501

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

NOTE: FFRDC'S - FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 27. FEDERAL OBLIGATIONS FOR TOTAL RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES 1983	ESTIMATES 1984
TOTAL, ALL FIELDS	6,729,708	7,619,332	8,514,115	9,606,758	10,535,005	11,597,378	12,212,780	13,022,185	14,154,328	14,663,239
LIFE SCIENCES	2,455,195	2,649,696	3,007,749	3,427,133	3,848,281	4,192,335	4,435,640	4,745,499	5,133,015	5,251,028
PSYCHOLOGY	139,192	143,996	156,201	193,243	197,384	199,009	208,898	218,396	241,425	271,714
PHYSICAL SCIENCES	1,096,644	1,258,892	1,530,171	1,645,647	1,792,554	2,000,612	2,220,534	2,500,381	2,851,741	3,178,837
ENVIRONMENTAL SCIENCES	727,269	769,284	906,001	1,024,566	1,100,984	1,260,957	1,121,080	1,148,303	1,218,581	1,188,635
MATH & COMPUTER SCI ..	125,260	157,794	195,880	216,280	210,301	240,943	278,925	350,080	399,429	481,591
ENGINEERING	1,717,777	2,068,655	2,112,917	2,404,595	2,571,630	2,830,131	3,071,454	3,386,543	3,501,489	3,486,898
SOCIAL SCIENCES	301,816	392,456	426,125	489,486	527,310	523,811	497,427	385,939	425,502	432,280
OTHER SCIENCES, NEC ..	166,555	178,559	179,071	205,808	286,561	349,580	378,822	287,044	383,146	372,256

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 28. FEDERAL OBLIGATIONS FOR BASIC RESEARCH BY AGENCY: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

AGENCY	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL, ALL AGENCIES ..	2,588,427	2,767,454	3,258,640	3,698,604	4,192,665	4,674,156	5,041,295	5,481,605	6,086,013	6,615,380
DEPT OF AGRICULTURE ..	154,184	171,371	204,450	242,704	256,420	275,650	314,128	330,755	363,312	380,817
DEPT OF COMMERCE	8,109	11,001	12,302	11,806	11,900	15,910	16,204	16,867	17,961	16,489
DEPT OF DEFENSE, TOTAL	300,065	326,885	373,254	410,410	471,527	540,341	604,285	686,684	769,834	868,473
ARMY	71,690	81,386	99,039	104,073	115,040	132,190	148,089	187,662	194,977	220,374
NAVY	118,702	129,673	153,769	172,088	192,122	214,900	238,000	280,300	314,000	330,200
AIR FORCE	78,941	83,926	84,800	95,100	105,025	108,200	125,800	145,800	157,600	206,600
DEFENSE AGENCIES ...	30,732	31,900	35,646	39,149	59,340	85,051	92,396	72,922	103,257	111,299
DEPT OF EDUCATION	N/A	N/A	N/A	N/A	20,567	17,583	20,576	14,199	14,606	12,837
DEPT OF ENERGY	N/A	N/A	389,450	440,534	462,968	523,136	586,340	642,211	717,068	800,783
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 1/ .	903,747	986,172	1,119,495	1,292,339	1,576,011	1,762,668	1,900,384	2,144,694	2,388,397	2,468,104
NAT'L INST OF HEALTH	828,520	920,312	1,032,776	1,181,094	1,463,703	1,642,341	1,766,788	2,020,650	2,243,944	2,305,135
OTHER HHS	75,227	65,860	86,719	111,245	112,308	120,327	133,596	124,044	144,453	162,969
DEPT OF THE INTERIOR .	54,944	54,330	63,579	65,876	72,522	71,634	80,663	76,454	100,021	89,724
DEPT OF JUSTICE	9,465	4,500	5,100	14,700	7,900	9,525	4,631	3,087	4,176	2,404
DEPT OF LABOR	877	958	703	3,678	2,286	3,876	3,740	6,508	3,837	4,414
DEPT OF STATE	1,500	-	-	-	45	-	-	-	-	-
DEPT OF TRANSPORTATION	75	-	-	-	-	-	1,210	1,000	1,400	1,550
DEPT OF THE TREASURY .	-	-	-	-	220	1,731	2,344	2,196	3,323	3,657
OTHER AGENCIES										
ENERGY RESEARCH & DEVELOPMENT ADMIN ..	312,758	345,790	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ENVIRONMENTAL PROTECTION AGENCY ..	17,400	13,700	8,296	6,010	10,100	13,600	10,500	32,687	20,707	17,408
NAT'L AERONAUTICS & SPACE ADMIN	309,335	293,209	413,774	479,729	512,847	559,113	531,122	535,733	604,664	681,521
NAT'L SCI FOUNDATION .	485,989	523,634	624,900	678,040	733,255	815,246	896,569	916,078	998,529	1,181,062
SMITHSONIAN INST	24,785	25,735	29,651	34,896	36,901	41,006	44,861	52,357	55,749	63,618
VETERANS ADMIN	3,880	8,900	9,095	8,891	9,523	14,300	15,000	12,900	15,200	15,100
ALL OTHER AGENCIES ...	1,314	1,269	4,591	8,991	7,673	8,837	8,738	7,195	7,229	7,419

1/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE AMOUNTS.

NOTE: N/A (NOT APPLICABLE) INDICATES THAT THE AGENCY OR AGENCY SUBDIVISION DID NOT EXIST AS SUCH OR IN THAT ORGANIZATION IN THAT YEAR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 29. FEDERAL OBLIGATIONS FOR BASIC RESEARCH BY PERFORMER: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

PERFORMER	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL	2,588,427	2,767,454	3,258,640	3,698,604	4,192,665	4,674,156	5,041,295	5,481,605	6,086,013	6,615,380
FEDERAL INTRAMURAL 1/	733,512	786,017	914,084	1,029,258	1,089,126	1,182,465	1,301,827	1,465,534	1,650,367	1,774,289
INDUSTRIAL FIRMS EXCL FFRDC'S	118,506	131,077	208,130	247,715	277,074	325,276	292,916	270,896	301,504	331,265
FFRDC'S ADMIN BY INDUSTRIAL FIRMS ...	47,857	59,811	53,065	65,416	66,642	70,352	73,278	87,384	89,081	97,721
UNIV & COLLEGES EXCL FFRDC'S	1,260,609	1,341,738	1,555,067	1,759,234	2,079,925	2,320,253	2,503,223	2,727,126	3,018,252	3,294,955
FFRDC'S ADMIN BY UNIV & COLLEGES	257,548	284,884	324,119	356,772	393,607	436,824	490,565	516,704	578,720	663,445
NONPROFIT INST EXCL FFRDC'S	128,234	126,494	162,530	192,766	240,317	279,503	313,140	355,605	373,465	384,856
FFRDC'S ADMIN BY NONPROFIT INST	13,824	7,892	5,645	5,769	6,700	7,509	8,638	8,990	7,857	7,448
STATE AND LOCAL GOV ..	14,009	12,914	15,603	17,050	19,758	23,875	26,530	24,473	34,997	27,533
FOREIGN	14,328	16,627	20,397	24,624	19,516	28,099	31,178	24,893	31,770	33,868

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

NOTE: FFRDC'S - FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 30. FEDERAL OBLIGATIONS FOR BASIC RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL, ALL FIELDS	2,588,427	2,767,454	3,258,640	3,698,604	4,192,665	4,674,156	5,041,295	5,481,605	6,086,013	6,615,380
LIFE SCIENCES	1,115,929	1,222,015	1,383,365	1,588,390	1,891,777	2,054,425	2,223,848	2,526,017	2,796,346	2,926,579
PSYCHOLOGY	58,642	45,529	55,717	84,049	75,069	84,206	90,992	89,875	99,017	105,190
PHYSICAL SCIENCES	708,959	721,435	889,994	941,421	1,050,002	1,220,588	1,324,940	1,393,844	1,556,765	1,731,484
ENVIRONMENTAL SCIENCES	280,763	294,325	387,454	451,278	457,284	522,360	532,833	520,049	560,316	605,936
MATH & COMPUTER SCI ..	62,007	81,805	83,408	97,737	104,164	116,258	140,360	165,064	195,780	239,993
ENGINEERING	262,847	272,799	337,683	375,985	434,658	465,228	526,018	610,467	665,455	786,041
SOCIAL SCIENCES	73,757	86,426	95,513	124,347	129,718	147,180	136,951	120,198	125,169	136,364
OTHER SCIENCES, NEC ..	25,523	43,120	25,506	35,397	49,993	63,911	65,353	56,091	87,165	83,793

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 31. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH BY AGENCY: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

AGENCY	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES 1983	ESTIMATES 1984
TOTAL, ALL AGENCIES ..	4,141,281	4,851,878	5,255,475	5,908,154	6,342,340	6,923,222	7,171,485	7,540,580	8,068,315	8,047,859
DEPT OF AGRICULTURE ..	247,760	270,853	319,570	351,780	375,500	381,785	426,856	435,708	459,153	438,081
DEPT OF COMMERCE	136,311	144,712	163,827	180,969	207,558	238,523	233,171	259,188	262,166	183,204
DEPT OF DEFENSE, TOTAL	1,130,942	1,200,596	1,342,591	1,413,648	1,542,571	1,721,428	1,996,615	2,266,137	2,391,690	2,703,706
ARMY	264,682	281,009	298,954	305,737	333,570	347,065	388,366	451,561	457,972	525,539
NAVY	287,789	308,277	343,593	354,229	375,193	396,200	460,000	498,400	507,900	552,800
AIR FORCE	276,901	298,376	340,975	353,645	387,228	429,100	491,500	488,100	499,000	526,000
DEFENSE AGENCIES ...	299,902	312,234	357,769	392,537	446,580	549,063	656,749	828,076	926,818	1,099,367
OTHER DOD	1,668	700	1,300	7,500	-	-	-	-	-	-
DEPT OF EDUCATION	N/A	N/A	N/A	N/A	72,825	69,992	33,212	56,268	63,488	58,352
DEPT OF ENERGY	N/A	N/A	501,816	661,709	668,878	754,190	827,265	1,053,877	1,251,532	1,029,825
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 1/	1,021,083	1,164,561	1,294,785	1,448,378	1,439,658	1,570,109	1,591,857	1,460,890	1,584,345	1,625,594
NAT'L INST OF HEALTH	775,697	847,380	935,882	1,051,502	1,066,408	1,145,129	1,181,521	1,103,802	1,199,380	1,217,673
OTHER HHS	245,386	317,181	358,903	396,876	373,250	424,980	410,336	357,088	384,965	407,921
DEPT OF HOUSING & URBAN DEVELOPMENT ..	33,495	36,945	32,720	30,535	23,770	19,601	16,690	10,310	11,936	10,089
DEPT OF THE INTERIOR .	179,109	205,128	192,363	217,616	266,946	282,812	289,174	275,006	268,739	220,724
DEPT OF JUSTICE	9,430	13,817	12,484	31,022	20,946	19,235	14,872	13,218	19,653	12,041
DEPT OF LABOR	14,401	17,042	18,024	22,033	39,796	32,556	54,457	10,647	12,032	12,856
DEPT OF STATE	20,958	25,128	38,270	49,126	2,649	1,956	1,606	1,549	1,596	1,608
DEPT OF TRANSPORTATION	53,769	31,100	51,760	66,500	66,983	82,445	87,379	65,685	77,197	79,635
DEPT OF THE TREASURY .	400	1,474	2,140	4,114	4,498	3,956	2,875	5,949	7,922	7,988
OTHER AGENCIES										
AGENCY FOR INTERNAT'L DEVELOPMENT 2/	N/A	N/A	N/A	N/A	66,886	79,664	86,400	127,904	117,287	140,645
ENERGY RESEARCH & DEVELOPMENT ADMIN ..	280,673	400,709	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ENVIRONMENTAL PROTECTION AGENCY ..	124,311	141,695	196,956	246,660	248,900	231,500	307,800	210,692	153,187	131,223
NAT'L AERONAUTICS & SPACE ADMIN	625,804	929,632	792,302	865,438	938,389	1,050,531	876,036	871,407	956,871	965,359
NAT'L SCI FOUNDATION .	84,026	72,142	63,400	65,462	66,770	58,441	58,895	57,087	61,671	59,403
NUCLEAR REGULATORY COMMISSION	64,155	88,432	112,291	133,891	148,772	182,672	219,667	220,287	209,500	199,740
VETERANS ADMIN	83,260	76,227	83,247	90,509	101,839	103,600	112,700	110,100	131,200	128,200
ALL OTHER AGENCIES ...	31,394	31,685	36,929	28,764	38,206	38,226	33,958	28,671	27,150	39,585

1/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE AMOUNTS.

2/ INCLUDES PROGRAMS OF THE INTERNATIONAL DEVELOPMENT COOPERATION AGENCY FOR FISCAL YEARS 1979-81.

NOTE: N/A (NOT APPLICABLE) INDICATES THAT THE AGENCY OR AGENCY SUBDIVISION DID NOT EXIST AS SUCH OR IN THAT ORGANIZATION IN THAT YEAR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 32. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH BY PERFORMER: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

PERFORMER	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL	4,141,281	4,851,878	5,255,475	5,908,154	6,342,340	6,923,222	7,171,485	7,540,580	8,068,315	8,047,859
FEDERAL INTRAMURAL 1/.	1,730,268	2,093,149	2,043,582	2,191,504	2,392,106	2,483,807	2,732,372	2,728,671	2,926,600	2,862,287
INDUSTRIAL FIRMS EXCL FFRDC'S	891,740	971,877	1,159,126	1,403,691	1,484,877	1,752,329	1,665,390	1,885,679	2,038,454	2,095,290
FFRDC'S ADMIN BY INDUSTRIAL FIRMS ...	87,844	116,698	139,104	169,757	178,338	240,679	278,066	399,964	426,021	404,281
UNIV & COLLEGES EXCL FFRDC'S	818,157	907,997	1,028,440	1,168,805	1,253,450	1,378,816	1,416,921	1,318,311	1,389,284	1,372,090
FFRDC'S ADMIN BY UNIV & COLLEGES	167,964	263,394	346,185	358,078	406,994	414,331	450,037	539,997	586,560	623,373
NONPROFIT INST EXCL FFRDC'S	266,442	308,940	349,633	398,085	382,326	398,943	392,057	387,929	430,917	401,056
FFRDC'S ADMIN BY NONPROFIT INST	50,992	49,606	49,907	61,157	66,652	64,210	59,066	95,164	75,983	88,687
STATE AND LOCAL GOV ..	97,898	106,457	99,574	111,777	119,708	127,057	102,782	101,433	109,571	112,162
FOREIGN	29,976	33,760	39,924	45,300	57,889	63,048	74,794	83,432	84,925	88,633

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

NOTE: FFRDC'S - FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 33. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL, ALL FIELDS	4,141,281	4,851,878	5,255,475	5,908,154	6,342,340	6,923,222	7,171,485	7,540,580	8,068,315	8,047,859
LIFE SCIENCES	1,339,266	1,427,681	1,624,384	1,838,743	1,956,504	2,137,910	2,211,792	2,219,482	2,336,669	2,324,449
PSYCHOLOGY	80,550	98,467	100,484	109,194	122,315	114,803	117,906	128.521	142,408	166,524
PHYSICAL SCIENCES	387,685	537,457	640,177	704,226	742,552	780,024	895,594	1,106,537	1,294,976	1,447,353
ENVIRONMENTAL SCIENCES	446,506	474,959	518,547	573,288	643,700	738,597	588,247	628,254	658,265	582,699
MATH & COMPUTER SCI ..	63,253	75,989	112,472	118,543	106,137	124,685	138,565	185,016	203,649	241,598
ENGINEERING	1,454,930	1,795,856	1,775,234	2,028,610	2,136,972	2,364,903	2,545,436	2,776,076	2,836,034	2,700,857
SOCIAL SCIENCES	228,059	306,030	330,612	365,139	397,592	376,631	360,476	265,741	300,333	295,916
OTHER SCIENCES, NEC ..	141,032	135,439	153,565	170,411	236,568	285,669	313,469	230,953	295,981	288,463

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 34. FEDERAL OBLIGATIONS FOR DEVELOPMENT BY AGENCY: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

AGENCY	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES	
									1983	1984
TOTAL, ALL AGENCIES .	12,309,110	13,160,326	14,936,262	16,238,379	17,610,137	18,233,054	20,891,144	23,410,404	24,555,744	30,833,759
DEPT OF AGRICULTURE ..	18,138	20,225	22,943	26,798	31,105	30,151	32,974	30,811	30,403	29,460
DEPT OF COMMERCE	70,96[illegible]	73,140	68,592	90,890	89,901	88,116	78,550	60,223	58,490	34,568
DEPT OF DEFENSE, TOTAL	7,581,465	[illegible]7.241	9,247,506	9,729,580	10,492,127	11,719,243	13,907,749	17,669,753	19,963,59[illegible]	26,163,348
ARMY	1,560,370	1,651,258	2,043,873	2,139,117	2,320,064	2,500,732	2,707,704	3,121,266	3,312,066	4,158,200
NAVY	2,693,674	2,890,055	3,320,048	3,472,099	3,767,727	4,095,032	4,307,952	5,066,356	5,221,781	7,180,335
AIR FORCE	3,157,653	3,344,325	3,605,320	3,813,604	4,033,363	4,673,729	6,351,947	8,72[illegible],958	10,280,700	13,131,358
DEFENSE AGENCIES ...	145,903	217,513	248,026	276,200	341,663	411,870	499,095	717,136	1,085,204	1,637,117
OTHER DOD	23,865	24,090	30,239	28,560	29,310	37,880	41,051	41,037	63,847	56,338
DEPT OF EDUCATION	N/A	N/A	N/A	N/A	72,896	51,797	51,074	57,514	67,272	55,062
DEPT OF ENERGY	N/A	N/A	2,644,954	3,142,584	3,506,920	3,476,362	3,504,620	3,012,070	2,636,820	2,686,232
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 1/ .	472,628	432,830	409,017	466,537	489,211	447,444	434,900	335,161	353,962	341,099
NAT'L INST OF HEALTH	275,655	292,555	311,201	348,266	423,022	394,360	384,940	308,696	330,340	330,378
OTHER HHS	196,973	140,275	97,816	118,271	66,189	53,084	49,960	26,465	23,622	10,721
DEPT OF HOUSING & URBAN DEVELOPMENT ..	28,533	30,630	19,384	39,188	44,145	36,424	31,418	18,545	20,006	17,083
DEPT OF THE INTERIOR .	69,276	73,740	58,740	75,482	66,310	56,812	57,268	29,614	28,383	17,342
DEPT OF JUSTICE	25,435	15,542	10,066	15,197	14,145	12,741	7,024	10,387	11,535	9,281
DEPT OF LABOR	10,098	10,533	10,838	72,124	94,895	101,621	3,991	8,255	2,148	2,325
DEPT OF STATE	5,432	14,246	23,136	36,082	474	250	160	-	-	-
DEPT OF TRANSPORTATION	257,719	263,400	302,844	341,750	303,106	278,785	326,950	243,398	315,859	438,770
DEPT OF THE TREASURY .	1,265	2,261	2,665	5,764	4,823	6,346	6,087	5,178	4,864	4,781
OTHER AGENCIES										
AGENCY FOR INTERNAT'L DEVELOPMENT 2/	N/A	N/A	N/A	N/A	39,586	69,658	47,830	72,007	57,899	65,857
ENERGY RESEARCH & DEVELOPMENT ADMIN ..	1,453,875	1,717,310	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ENVIRONMENTAL PROTECTION AGENCY ..	115,946	103,743	90,198	131,966	151,100	99,900	107,400	91,710	66,900	59,100
NAT'L AERONAUTICS & SPACE ADMIN	2,129,274	2,223,989	1,964,713	1,988,093	2,127,168	1,624,444	2,185,997	1,670,719	854,415	815,620
NAT'L SCI FOUNDATION .	25,006	13,480	8,719	5,273	7,900	8,105	6,100	2,162	-	-
VETERANS ADMIN	7,667	12,552	14,659	14,591	15,642	15,500	16,700	14,300	16,300	16,500
ALL OTHER AGENCIES ...	36,391	25,464	37,288	56,480	58,683	109,355	84,352	78,597	66,890	77,331

1/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE AMOUNTS.

2/ INCLUDES PROGRAMS OF THE INTERNATIONAL DEVELOPMENT COOPERATION AGENCY FOR FISCAL YEARS 1979-81.

NOTE: N/A (NOT APPLICABLE) INDICATES THAT THE AGENCY OR AGENCY SUBDIVISION DID NOT EXIST AS SUCH OR IN THAT ORGANIZATION IN THAT YEAR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 35. FEDERAL OBLIGATIONS FOR DEVELOPMENT BY PERFORMER: FISCAL YEARS 1975-84

(THOUSANDS OF DOLLARS)

PERFORMER	1975	1976	1977	1978	1979	1980	1981	1982	ESTIMATES 1983	ESTIMATES 1984
TOTAL	12,309,110	13,160,326	14,936,262	16,238,379	17,610,137	18,233,054	20,891,144	23,410,404	24,555,744	30,833,759
FEDERAL INTRAMURAL 1/.	2,890,182	2,889,553	3,054,014	3,589,660	3,936,296	3,966,061	4,351,546	4,946,825	5,651,304	6,333,360
INDUSTRIAL FIRMS EXCL FFRDC'S	7,412,996	8,237,340	9,349,970	9,748,578	10,410,450	10,891,540	12,909,587	15,035,649	15,389,292	20,530,874
FFRDC'S ADMIN BY INDUSTRIAL FIRMS ...	567,951	637,335	920,551	1,007,309	1,073,116	1,097,031	1,062,550	1,019,078	1,009,960	1,112,438
UNIV & COLLEGES EXCL FFRDC'S	332,666	302,066	321,968	446,592	555,469	564,361	545,611	560,035	588,569	603,659
FFRDC'S ADMIN BY UNIV & COLLEGES	309,564	512,837	642,844	597,095	687,665	682,154	850,375	919,970	923,619	1,005,035
NONPROFIT INST EXCL FFRDC'S	307,666	273,149	287,861	407,327	403,847	427,122	363,584	348,117	372,288	549,634
FFRDC'S ADMIN BY NONPROFIT INST	155,102	173,540	208,323	248,991	295,382	370,117	457,527	416,419	484,297	587,061
STATE AND LOCAL GOV ..	115,711	111,794	122,867	139,583	170,655	114,610	92,899	58,359	65,469	49,385
FOREIGN	17,272	22,712	27,864	53,244	77,257	120,058	217,465	105,952	70,946	62,313

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

NOTE: FFRDC'S - FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS

SOURCE: NATIONAL SCIENCE FOUNDATION

Table 36. R&D scientists and engineers employed in the Federal Government by broad field categories[1]: selected years

Broad field categories	1976	1977	1978	1979	1980
Total	60,300	62,200	64,300	64,600	65,600
Military total	4,100	4,800	5,400	5,300	5,200
Civilian total	56,200	57,400	58,900	59,300	60,400
Scientists	28,300	28,900	29,700	29,900	30,400
Physical and environmental scientists	15,200	15,500	15,900	16,000	16,300
Life scientists	6,800	6,900	7,100	7,200	7,300
Mathematicians and statisticians	3,600	3,700	3,800	3,800	3,900
Social scientists[2]	1,600	1,600	1,700	1,700	1,700
Psychologists	1,100	1,200	1,200	1,200	1,200
Engineers	27,900	28,500	29,200	29,400	30,000

[1] Includes R&D administrators, R&D grant and contract administrators, personnel directly engaged in R&D activities and uniformed military S/E personnel. Data are calculated on a full-time-equivalent basis.

[2] Includes the fields of economics, sociology, anthropology, geography, cartography, and community planning.

NOTE: Data on military S/E personnel are estimated; detailed data on fields are estimated, based on totals provided by the Office of Personnel Management.

SOURCES: National Science Foundation and Office of Personnel Management

Table 37. Funds for industrial R&D performance by source: 1971-82

[Dollars in millions]

Year	Total R&D		Federal			Company		
	Current dollars	Constant 1972 dollars[1]	Current dollars	Constant 1972 dollars[1]	Percent of total	Current dollars	Constant 1972 dollars[1]	Percent of total
1971	18,320	19,061	7,666	7,985	42	10,654	11,097	58
1972	19,552	19,552	8,017	8,017	41	11,535	11,535	59
1973	21,249	20,094	8,145	7,702	38	13,104	12,391	62
1974	22,887	19,889	8,220	7,143	36	14,667	12,745	64
1975	24,187	19,228	8,605	6,841	36	15,582	12,387	64
1976	26,997	20,400	9,561	7,225	35	17,436	13,175	65
1977	29,825	21,296	10,485	7,487	35	19,340	13,809	65
1978	33,304	22,141	11,189	7,439	34	22,115	14,702	66
1979	38,226	23,391	12,518	7,660	33	25,708	15,731	67
1980	44,505	24,944	14,029	7,863	32	30,476	17,081	68
1981	51,810	26,550	16,382	8,395	32	35,428	18,155	68
1982	58,960	28,500	19,059	9,213	32	39,901	19,267	68

[1] Based on the GNP implicit price deflator.

SOURCE: National Science Foundation

Table 38. Funds for industrial R&D performance by industry: 1971-82

[Dollars in millions]

Industry	SIC code	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total		$18,320	$19,552	$21,249	$22,887	$24,187	$26,997	$29,825	$33,304	$38,226	$44,505	$51,810	$58,960
Food and kindred products	20	240	259	269	298	335	355	415	472	528	620	(1)	(1)
Textiles and apparel	22,23	59	61	64	69	70	82	83	89	101	115	(1)	(1)
Lumber, wood products, and furniture	24,25	53	64	71	84	88	107	123	126	139	148	161	159
Paper and allied products	26	187	189	194	237	249	313	333	387	445	405	(1)	626
Chemicals and allied products	28	1,832	1,932	2,116	2,450	2,727	3,017	3,202	3,580	4,038	4,636	5,625	6,588
Industrial chemicals	281-82,286	1,009	1,031	1,119	1,299	1,391	1,524	1,668	1,798	1,962	2,197	2,802	3,191
Drugs and medicines	283	549	607	686	807	981	1,091	1,117	1,308	1,517	1,777	(1)	(1)
Other chemicals	284-85,287-89	274	294	299	344	354	401	417	474	559	662	(1)	(1)
Petroleum refining	29	505	468	498	622	693	767	918	1,060	1,262	1,552	(1)	(1)
Rubber products	30	289	377	426	469	487	502	491	493	577	656	(1)	(1)
Stone, clay, and glass products	32	164	183	199	217	233	263	287	324	356	406	(1)	(1)
Primary metals	33	272	277	307	358	443	506	538	560	634	728	878	1,005
Ferrous metals and products	331-32,3398-99	144	146	163	181	215	256	284	314	[illegible]	443	(1)	(1)
Nonferrous metals and products	333-36	128	130	145	177	228	250	254	246	259	285	(1)	(1)
Fabricated metal products	34	242	253	291	313	324	358	386	384	455	550	624	570
Machinery	35	1,860	2,158	2,549	2,985	3,196	3,487	3,880	4,263	4,825	5,901	6,818	7,879
Office, computing, and accounting machines	357	(2)	1,456	1,733	2,103	2,220	2,402	2,655	2,883	3,214	3,962	(1)	(1)
Other machinery, except electrical	351-56,358-59	(2)	(3)	(3)	(3)	(3)	(3)	1,225	1,400	1,611	1,939	(1)	(1)
Electrical equipment	36	4,389	4,680	4,902	5,011	5,105	5,636	5,886	6,507	7,824	9,175	10,329	11,925
Radio and TV receiving equipment	365	64	48	49	51	50	52	98	130	245	556	(1)	(1)
Electronic components	367		330	406	489	549	691	770	902	1,169	1,547	1,573	5,775
	2,604	2,731											
Communication equipment	366		2,583	2,613	2,424	2,385	2,511	2,725	2,999	3,635	4,024	4,758	1,803
Other electrical equipment	361-64,369	1,594	1,719	1,834	2,047	2,121	2,382	2,295	2,476	2,775	3,048	(1)	(1)
Motor vehicles and motor vehicles equipment	371	1,768	1,954	2,405	2,389	2,340	2,778	3,358	3,879	4,509	4,955	4,806	4,962
Other transportation equipment	373-75,379		56	72	87	90	94	120	131	159	162	(1)	(1)
Aircraft and missiles	372,376	4,881	4,350	5,052	5,278	5,713	6,339	7,033	7,536	8,041	9,198	11,966	14,045
Professional and scientific instruments	38	746	838	961	1,075	1,173	1,331	1,571	1,998	2,505	3,029	3,614	4,047
Scientific and mechanical measuring instruments	381-82	133	163	186	221	266	325	452	670	950	1,352	(1)	(1)
Optical, surgical, photographic and other instruments	383-87	612	675	775	854	907	1,007	1,119	1;328	1,555	1,677	(1)	(1)
Other manufacturing industries	21,27,31,39	131	146	158	177	205	217	243	266	288	364	(1)	(1)
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	704	707	715	768	735	845	958	1,229	1,540	1,815	1,906	2,168

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 39. Federal funds for industrial R&D performance by industry: 1971-82

[Dollars in millions]

Industry	SIC code	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total	....	$7,666	$8,017	$8,145	$8,220	$8,605	$9,561	$10,485	$11,189	$12,516	$14,029	$16,382	$19,058
Food and kindred products	20	2	1	1	1	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Textiles and apparel	22,23	1	1	1	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Lumber, wood products, and furniture	24,25	(¹)	(¹)	(¹)	(¹)	0	0	0	0	0	(¹)	0	0
Paper and allied products	26	(¹)	2	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	0
Chemicals and allied products	28	184	189	203	214	236	286	295	330	348	372	421	433
Industrial chemicals	281-82,286	159	171	183	194	218	249	281	325	345	341	409	422
Drugs and medicines	283	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Other chemicals	284-85,287-89	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Petroleum refining	29	17	15	14	20	(¹)	52	76	121	153	151	(¹)	(¹)
Rubber products	30	69	123	148	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Stone, clay, and glass products	32	10	14	15	14	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Primary metals	33	6	12	11	8	21	26	44	63	95	135	176	279
Ferrous metals and products	331-32,3398-99	2	3	4	(¹)	3	4	23	43	70	105	(¹)	(¹)
Nonferrous metals and products	333-36	4	10	7	(¹)	17	22	21	20	25	30	(¹)	(¹)
Fabricated metal products	34	11	12	13	14	27	36	44	36	41	49	80	57
Machinery	35	315	401	429	511	509	532	477	382	335	647	694	859
Office, computing, and accounting machines	357	(¹)	(¹)	(¹)	(¹)	486	509	435	327	256	(¹)	(¹)	(¹)
Other machinery, except electrical	351-56,358-59	(³)	(³)	(³)	(³)	(³)	(³)	42	55	79	(¹)	(¹)	(¹)
Electrical equipment	36	2,211	2,367	2,410	2,307	2,307	2,555	2,648	2,766	3,309	3,744	3,920	4,590
Radio and TV receiving equipment	365	(¹)	(¹)	(¹)	(¹)	(¹)	0	11	28	53	210	(¹)	(¹)
Electronic components	367	1,479	125	148	184	(¹)	(¹)	(¹)	(¹)	(¹)	382	361	392
Communication equipment	366		1,417	1,362	1,137	1,057	1,093	1,166	1,236	1,586	1,657	1,783	2,181
Other electrical equipment	361-64,369	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	1,495	(¹)	(¹)
Motor vehicles and motor vehicles equipment	371	309	293	385	288	318	383	471	498	729	655	587	801
Other transportation equipment	373-75,379		26	39	47	47	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)	(¹)
Aircraft and missiles	372,376	3,664	3,970	3,899	4,000	4,428	4,921	5,486	5,713	5,840	6,626	8,526	10,151
Professional and scientific instruments	38	164	161	160	167	172	163	221	330	493	573	637	646
Scientific and mechanical measuring instruments	381-82	14	13	11	10	15	15	47	110	203	350	(¹)	(¹)
Optical, surgical, photographic and other instruments	383-87	150	148	149	157	157	148	174	220	290	223	(¹)	(¹)
Other manufacturing industries	21,27,31,39	(¹)	(¹)	(¹)	(¹)	7	5	39	0	0	25	(¹)	(¹)
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	452	431	416	463	310	375	417	527	681	779	858	968

¹Not separately available but included in total.
²Data not tabulated at this level prior to 1972.
³Data not tabulated at this level prior to 1977.
SOURCE: National Science Foundation

Table 40. Company funds for industrial R&D performance by industry: 1971-82

[Dollars in millions]

Industry	SIC code	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total	....	$10,654	$11,535	$13,104	$14,667	$15,582	$17,436	$19,340	$22,115	$25,708	$30,476	$35,428	$39,901
Food and kindred products	20	238	258	268	297	(1)	(1)	(1)	(1)	(1)	(1)	636	745
Textiles and apparel	22,23	59	61	63	(1)	(1)	(1)	(1)	(1)	(1)	(1)	116	125
Lumber, wood products, and furniture	24,25	(1)	(1)	(1)	(1)	86	106	123	126	139	148	161	159
Paper and allied products	26	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	495	566	626
Chemicals and allied products	28	1,648	1,741	1,913	2,236	2,490	2,751	2,907	3,250	3,692	4,264	5,205	6,155
Industrial chemicals	281-82,286	850	860	936	1,105	1,173	1,275	1,387	1,473	1,617	1,856	2,393	2,769
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,756	2,064	2,531
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	653	747	855
Petroleum refining	29	468	454	485	603	(1)	715	842	939	1,109	1,401	1,780	2,002
Rubber products	30	221	255	280	(1)	(1)	(1)	(1)	(1)	(1)	(1)	598	671
Stone, clay, and glass products	32	153	168	184	203	(1)	(1)	(1)	(1)	(1)	363	411	418
Primary metals	33	266	264	297	350	422	481	494	497	539	594	702	727
Ferrous metals and products	331-32,3398-99	142	144	159	(1)	211	252	261	271	305	338	415	446
Nonferrous metals and products	333-36	124	121	138	(1)	211	229	233	227	234	256	287	281
Fabricated metal products	34	230	243	279	299	297	322	342	348	414	501	545	512
Machinery	35	1,545	1,758	2,120	2,473	2,687	2,955	3,403	3,901	4,490	5,254	6,124	7,020
Office, computing, and accounting machines	357	(1)	(1)	(1)	(1)	1,734	1,893	2,220	2,556	2,958	3,436	3,847	4,717
Other machinery, except electrical	351-56,358-59	(3)	(3)	(3)	(3)	(3)	(3)	1,183	1,345	1,532	1,818	2,277	2,303
Electrical equipment	36	2,131	2,313	2,491	2,704	2,798	3,061	3,238	3,741	4,515	5,431	6,409	7,336
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	52	85	102	192	346	358	397
Electronic components	367	1,252	205	260	306	(1)	(1)	(1)	(1)	(1)	1,165	1,212	3,594
Communication equipment	366		1,165	1,251	1,287	1,328	1,418	1,559	1,763	2,049	2,367	2,975	1,411
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1,553	1,864	1,933
Motor vehicles and motor vehicles equipment	371	1,461	1,861	2,020	2,101	2,022	2,395	2,687	3,381	3,780	4,300	4,219	4,361
Other transportation equipment	373-75,379		29	33	40	43	(1)	(1)	(1)	(1)	86	80	90
Aircraft and missiles	372,376	1,017	978	1,154	1,278	1,285	1,418	1,547	1,823	2,201	2,570	3,440	3,895
Professional and scientific instruments	38	583	678	801	908	1,001	1,168	1,350	1,668	2,012	2,456	2,978	3,401
Scientific and mechanical measuring instruments	381-82	120	151	175	211	251	309	405	560	747	1,001	1,235	1,429
Optical, surgical, photographic and other instruments	383-87	463	527	626	697	750	859	945	1,108	1,265	1,454	1,743	1,972
Other manufacturing industries	21,27,31,39	(1)	(1)	(1)	(1)	198	212	204	266	288	339	411	478
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	252	277	299	305	425	471	541	702	859	1,037	1,048	1,180

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 41. R&D funds as a percent of net sales in R&D-performing manufacturing companies by industry: 1971-82

Industry	SIC code	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total	....	3.5	3.4	3.3	3.1	3.1	3.1	2.9	2.9	2.6	3.0	3.1	3.7
Food and kindred products	20	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	(1)	(1)
Textiles and apparel	22,23	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	(1)	(1)
Lumber, wood products, and furniture	24,25	.7	.8	.7	.8	.7	.7	.8	.7	.7	.8	.8	.9
Paper and allied products	26	.9	.8	.7	.8	.9	1.0	.9	.9	1.0	1.0	(1)	1.2
Chemicals and allied products	28	3.7	3.6	3.6	3.5	3.7	3.7	3.6	3.6	3.5	3.6	3.6	4.2
Industrial chemicals	281-82,286	3.9	3.9	3.6	3.3	3.6	3.7	3.5	3.5	3.2	3.3	3.2	3.9
Drugs and medicines	283	6.2	6.5	6.5	6.3	6.4	6.3	6.4	6.2	6.1	6.2	(1)	(1)
Other chemicals	284-85,287-89	1.9	1.7	1.6	1.6	1.7	1.7	1.8	1.8	1.8	1.9	(1)	(1)
Petroleum refining	29	.9	.8	.7	.6	.7	.6	.7	.7	.7	.6	(1)	(1)
Rubber products	30	2.2	2.6	2.6	2.5	2.5	2.4	2.1	1.9	1.9	2.2	(1)	(1)
Stone, clay, and glass products	32	1.8	1.7	1.7	1.7	1.2	1.2	1.3	1.3	1.3	1.4	(1)	(1)
Primary metals	33	.8	.7	.7	.6	.8	.8	.7	.7	.6	.7	.9	1.1
Ferrous metals and products	331-32,3398-99	.7	.6	.5	.5	.6	.6	.6	.6	.6	.7	(1)	(1)
Nonferrous metals and products	333-36	1.0	.9	.9	1.0	1.2	1.2	1.0	.8	.7	.7	(1)	(1)
Fabricated metal products	34	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.4	1.4	1.3
Machinery	35	4.0	4.3	4.6	4.6	4.8	4.9	4.9	4.6	4.5	5.0	4.9	6.1
Office, computing, and accounting machines	357	(2)	11.1	11.6	12.6	12.0	11.6	11.5	11.1	11.0	12.0	(1)	(1)
Other machinery, except electrical	351-56,358-59	(3)	(3)	(3)	(3)	(3)	(3)	2.2	2.1	2.1	2.3	(1)	(1)
Electrical equipment	36	7.2	7.1	6.9	6.6	6.5	6.7	6.9	5.8	6.0	6.6	6.8	7.8
Radio and TV receiving equipment	365	2.4	1.6	1.7	1.7	1.4	1.4	1.8	1.8	2.5	4.3	(1)	(1)
Communication equipment	366	8.2	8.7	8.1	7.6	7.6	7.6	7.7	7.7	8.8	9.1	9.6	11.5
Electronic components	367		5.9	6.2	6.2	6.9	7.3	6.8	6.7	7.1	7.9	7.4	7.0
Other electrical equipment	361-64,369	6.4	6.3	6.3	6.3	6.0	6.3	5.2	5.1	4.9	4.9	(1)	(1)
Motor vehicles and motor vehicles equipment	371	3.1	3.3	3.5	3.7	3.5	3.2	3.1	3.3	3.8	4.9	4.5	4.7
Other transportation equipment	373-75,379		1.0	1.2	1.3	1.3	1.3	1.2	.8	.8	.6	(1)	(1)
Aircraft and missiles	372,376	16.2	16.6	13.3	14.1	12.7	12.7	13.3	13.3	12.9	13.7	16.0	18.3
Professional and scientific instruments	38	5.7	5.9	6.1	6.1	5.9	6.2	6.3	6.9	7.3	7.5	8.1	8.9
Scientific and mechanical measuring instruments	381-82	3.7	4.1	4.3	4.5	4.9	5.4	6.3	7.1	7.3	8.4	(1)	(1)
Optical, surgical, photographic and other instruments	383-87	6.4	6.6	6.8	6.7	6.3	6.4	6.4	6.8	7.2	6.9	(1)	(1)
Other manufacturing industries	21,27,31,39	.8	.8	.8	.9	.8	.7	.8	.5	.4	.4	(1)	(1)

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 42. Company R&D funds as a percent of net sales in R&D-performing manufacturing companies by industry: 1971-82

Industry	SIC code	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total	....	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.1	2.2	2.5
Food and kindred products	20	.5	.4	.4	.4	(1)	(1)	(1)	(1)	(1)	(1)	.4	.4
Textiles and apparel	22,23	.5	.4	.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	.4	.5
Lumber, wood products, and furniture	24,25	(1)	(1)	(1)	(1)	.7	.7	.8	.7	.7	.8	.8	.9
Paper and allied products	26	(1)	.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1.0	1.0	1.2
Chemicals and allied products	28	3.3	3.3	3.1	3.0	3.1	3.3	3.3	3.2	3.2	3.3	3.4	3.9
Industrial chemicals	281-82,286	3.3	3.2	3.0	2.8	3.1	3.1	3.0	2.9	2.6	2.8	2.8	3.4
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	6.1	6.3	7.1
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1.9	2.1	2.1
Petroleum refining	29	.8	.7	.7	.5	(1)	.6	.6	.7	.6	.5	.6	.7
Rubber products	30	1.7	1.7	1.7	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1.9	2.2
Stone, clay, and glass products	32	1.6	1.6	1.5	1.5	(1)	(1)	(1)	(1)	(1)	1.3	1.4	1.5
Primary metals	33	.8	.7	.6	.5	.7	.8	.7	.6	.5	.5	.7	.8
Ferrous metals and products	331-32,3398-99	.7	.6	.5	(1)	.6	.6	.6	.5	.5	.5	.6	.7
Nonferrous metals and products	333-36	1.0	.9	.8	(1)	1.1	1.1	.9	.8	.6	.6	1.0	1.2
Fabricated metal products	34	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.2	1.2	1.2
Machinery	35	3.3	3.5	3.8	3.8	4.0	4.2	4.3	4.2	4.2	4.5	4.4	5.5
Office, computing, and accounting machines	357	(2)	(1)	(1)	(1)	9.4	9.1	9.6	9.8	10.1	10.4	9.7	10.3
Other machinery, except electrical	351-56,358-59	(3)	(3)	(3)	(3)	(3)	(3)	2.1	2.0	2.0	2.2	2.3	2.8
Electrical equipment	36	3.5	3.5	3.5	3.5	3.6	3.7	3.4	3.4	3.6	3.9	4.2	4.8
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	1.4	1.4	1.6	1.4	1.7	2.6	2.6	2.9
Electronic components	367	3.8	3.7	3.9	3.9	(1)	(1)	(1)	(1)	(1)	5.9	5.7	5.5
Communication equipment	366		3.9	3.9	3.9	4.2	4.3	4.4	4.5	5.0	5.4	6.0	7.2
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	2.5	2.8	3.1
Motor vehicles and motor vehicles equipment	371	2.9	2.8	2.9	3.2	3.0	2.7	2.7	2.9	3.2	4.2	3.9	4.1
Other transportation equipment	373-75,379		.6	.6	.6	.6	.6	.7	(1)	(1)	.3	.3	.2
Aircraft and missiles	372,376	3.4	3.3	3.0	3.5	2.8	2.6	2.9	3.2	3.5	3.8	4.6	5.1
Professional and scientific instruments	38	4.5	4.8	5.1	5.2	5.1	5.4	5.4	5.7	5.8	6.1	6.7	7.5
Scientific and mechanical measuring instruments	381-82	3.3	3.8	4.0	4.4	4.7	5.3	5.7	5.9	5.8	6.2	6.9	7.6
Optical, surgical, photographic and other instruments	383-87	4.9	5.1	5.5	5.5	5.2	5.5	5.4	5.6	5.9	6.0	6.6	7.3
Other manufacturing industries	21,27,31,39	(1)	(1)	(1)	(1)	.7	.7	.6	.5	.4	.4	.4	.5

[1] Not separately available but included in total.
[2] Data not tabulated at this level prior to 1972.
[3] Data not tabulated at this level prior to 1977.
SOURCE: National Science Foundation

Table 43. Funds for the performance of industrial basic research by industry: 1971-81

[Dollars in millions]

Industry	SIC code	1971	1972	1973	1974	1975	1976	1977	1979[4]	1981[4]
Total	....	$590	$593	$631	$699	$730	$819	$911	$1,158	$1,641
Food and kindred products	20	15	13	11	9	10	18	20	17	27
Textiles and apparel	22,23	2	2	1	2	(1)	(1)	(1)	(1)	1
Lumber, wood products, and furniture	24,25	(1)	(1)	(1)	(1)	3	5	7	5	(1)
Paper and allied products	26	4	4	5	7	5	6	9	18	32
Chemicals and allied products	28	216	214	236	288	294	304	337	366	539
Industrial chemicals	281-82,286	118	117	125	157	154	154	163	197	335
Drugs and medicines	283	77	78	90	107	112	119	134	143	(1)
Other chemicals	284-85,287-89	21	19	21	24	27	32	40	(1)	24
Petroleum refining	29	21	22	26	33	36	44	48	74	(1)
Rubber products	30	4	6	3	5	4	7	9	18	23
Stone, clay, and glass products	32	14	18	20	21	32	38	41	40	(1)
Primary metals	33	17	9	8	9	14	16	14	24	46
Ferrous metals and products	331-32,3398-99	(1)	(1)	(1)	(1)	4	5	5	12	(1)
Nonferrous metals and products	333-36	(1)	(1)	(1)	(1)	10	12	9	12	16
Fabricated metal products	34	(1)	7	11	3	5	2	2	4	8
Machinery	35	22	24	24	26	32	56	57	66	126
Office, computing, and accounting machines	357	(1)	(1)	(1)	(1)	26	38	4.	51	(1)
Other machinery, except electrical	351-56,358-59	(1)	(1)	(1)	(1)	(1)	18	16	15	(1)
Electrical equipment	36	136	137	143	143	132	163	181	226	279
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Electronic components	367	120	10	8	5	4	5	6	7	(1)
Communication equipment	366		108	117	118	109	130	150	195	(1)
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	21	10	8	9	10	8	12	(1)	(1)
Other transportation equipment	373-75,379		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aircraft and missiles	372,376	50	62	58	57	54	54	55	88	128
Professional and scientific instruments	38	19	17	15	16	16	23	24	(1)	40
Scientific and mechanical measuring instruments	381-82	7	6	5	5	9	10	12	(1)	(1)
Optical, surgical, photographic and other instruments	383-87	12	11	10	11	8	12	12	(1)	(1)
Other manufacturinn industries	21,27,31,39	6	5	6	6	(1)	(1)	(1)	42	21
Nonmanufacturing industries	07-17,41-67, 737 739,807,891	31	28	28	26	25	29	44	57	(1)

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

[4] Data not collected for 1978, 1980, and 1982.

SOURCE: National Science Foundation

Table 44. Funds for the performance of industrial basic research by field of science and engineering: 1971-81

[Dollars in millions]

Field of science/engineering	1971	1972	1973	1974	1975	1976	1977	1979[2]	1981[2]
Total	$590	$593	$63[illegible]	$699	$730	$819	$911	$1,158	$1,641
Physical sciences	281	277	276	319	320	359	405	527	650
Chemistry	180	183	193	229	228	253	285	381	485
Physics	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Astronomy	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mathematics	14	12	14	13	14	18	19	20	26
Environmental sciences	8	6	7	10	15	17	19	13	24
Atmospheric sciences	3	(1)	2	3	6	6	5	5	14
Geological sciences	3	4	3	5	5	7	7	6	8
Oceanography	2	(1)	1	1	3	4	7	2	(1)
Engineering (including metallurgy)	159	183	185	178	191	204	233	292	402
Life sciences	94	82	102	119	122	134	156	177	254
Biological sciences	57	61	77	83	85	102	128	136	157
Clinical medical sciences	37	21	25	36	37	32	28	40	97
Other sciences	34	33	47	60	67	85	78	128	285

[1] Not separately available but included in total.
[2] Data not collected for 1978, 1980, and 1982.
SOURCE: National Science Foundation

Table 45. Funds for the performance of industrial applied research: 1971-82

[Millions of constant 1972 dollars[1]]

Year	Funds	Percent change
1971	3,557	−5.1
1972	3,514	−1.2
1973	3,617	2.9
1974	3,726	3.0
1975	3,633	−2.5
1976	3,863	6.3
1977	4,024	4.2
1978	4,188	4.1
1979	4,421	5.6
1980	4,736	7.1
1981	5,496	16.0
1982	5,849	6.4

[1] Based on the GNP implicit price deflator.
SOURCE: National Science Foundation

Table 46. Funds for the performance of applied research and development by product field: 1970-81

[Dollars in millions]

Product field	SIC code	1970	1971	1972	1973	1974	1975	1976	1977	1979[3]	1981
Total		$17,465	$17,730	$18,959	$20,618	$22,188	$23,457	$26,178	$28,914	$37,068	$50,189
Atomic energy devices		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ordnance and accessories, n.e.c.	348	192	192	177	228	222	187	199	268	316	453
Guided missiles and spacecraft	376	3,115	2,832	2,647	2,491	2,486	2,925	2,880	3,024	$4,465	4,814
Food and kindred products	20	206	211	233	250	293	284	321	348	534	663
Textile mill products	22	55	60	83	93	82	73	81	96	(2)	(2)
Chemicals, except drugs and medicines	28, except 283	1,339	1,345	1,250	1,342	1,564	1,627	1,853	2,018	2,501	3,903
Industrial inorganic and organic chemicals	281, 286	442	457	451	489	589	665	728	819	(2)	1,020
Plastics materials and synthetic resins, rubber, and fibers	282	521	511	453	511	589	588	674	744	881	1,315
Agricultural chemicals	287	126	130	108	114	137	176	205	236	292	487
Other chemicals	284-85,289	223	218	238	229	248	198	246	220	(2)	1,081
Drugs and medicines	283	474	535	531	605	683	783	883	955	1,089	1,837
Petroleum refining and related industries	29	272	266	299	319	363	408	425	471	650	1,065
Rubber and miscellaneous plastics products	30	193	215	279	294	341	324	325	376	407	(2)
Stone, clay, and glass products	32	128	128	135	162	181	150	171	191	235	240
Primary metals	33	235	230	245	272	311	290	311	327	438	684
Ferrous metals and products	331-32,3398-99	127	114	137	158	156	144	163	172	225	268
Nonferrous metals and products	333-36	108	116	108	114	155	147	148	155	213	416
Fabricated metal products	34, except 348	622	701	731	769	903	916	1,025	1,152	1,381	1,518
Machinery	35	1,676	1,783	1,989	2,307	2,689	2,628	3,001	3,554	4,561	6,288
Engines and turbines	351	204	246	316	360	482	464	477	528	589	904
Farm machinery and equipment	352	89	90	93	120	131	138	168	221	295	231
Construction, mining, and materials handling	353	182	196	206	265	283	285	317	376	632	569
Metalworking machinery and equipment	354	86	84	76	69	74	80	83	125	340	227
Office, computing, and accounting machines	357	863	903	1,028	1,219	1,422	1,339	1,580	1,849	1,961	3,220
Other machinery, except electrical	355-56, 358-59	252	264	270	274	297	322	376	455	744	1,137
Electrical equipment, except communication	36, except 365-67, and 3825	3,372	686	775	857	929	774	874	901	980	1,724
Electric transmission and distribution equipment	361,3825		181	189	204	239	205	224	224	191	(2)
Electrical industrial apparatus	362		187	231	263	264	260	306	298	291	(2)
Other electrical equipment and supplies	363-64,368-69		320	355	390	426	309	344	379	498	653
Radio and TV receiving equipment, communication equipment, and electronic components	365-67		2,927	3,234	3,621	3,896	3,911	4,483	5,019	6,696	(2)
Motor vehicles and other transportation equipment	37, except 372,376	1,138	1,341	1,668	2,014	1,994	1,924	2,263	(2)	(2)	(2)
Motor vehicles and equipment	371	1,046	1,228	1,470	1,824	1,784	1,720	(2)	(2)	(2)	(2)
Other transportation equipment	373-75,379	90	113	198	190	210	204	193	201	205	(2)
Aircraft and parts	372	2,556	2,486	2,396	2,548	2,420	2,265	2,733	3,113	3,460	4,924
Professional and scientific instruments	38, except 3825	724	652	847	981	1,090	1,002	1,140	1,255	1,434	1,486
Other product fields, not elsewhere classified		1,194	1,177	1,440	1,465	1,742	2,987	3,179	3,201	4,062	5,657

[1] Distributed according to SIC code from 1968 to present.

[2] Not separately available but included in total.

[3] Data not collected for 1978, 1980, and 1982.

SOURCE: National Science Foundation

Table 47. Industrial expenditures for energy research and development by primary energy source: 1972-82 (projected)

[Dollars in millions]

Primary energy source	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982 (projected)
Total	$750	$1,009	$1,339	$1,774	$2,073	$2,573	$2,965	$3,643	$4,162	$4,270	$3,903
Fossil fuels	(1)	438	516	550	605	757	843	1,063	1,228	1,449	1,636
Oil	(1)	297	329	333	381	449[2]	(1)	557[2]	(1)	778	855
Gas	(1)	51	74	66	68	93[2]	(1)	113[2]	(1)	210	260
Shale	(1)	12	18	19	24	35[2]	(1)	24[2]	(1)	57	122
Coal	(1)	49	65	109	127	175[2]	(1)	313[2]	(1)	387	386
Synthetic fossil fuels	(1)	(1)	21	50	74	115[2]	(1)	236[2]	(1)	212	261
Mining	(1)	(1)	5	9	10	9[2]	(1)	1[2]	(1)	31	20
Other	(1)	(1)	39	50	43	51[2]	(1)	76[2]	(1)	143	105
Other fossil fuels	(1)	29	30	23	5	5[2]	(1)	56[2]	(1)	17	13
Nuclear	(1)	501	601	700	799	926	995	1,037	1,056	1,046	1,094
Fission	(1)	476	567	659	741	844[2]	(1)	913[2]	(1)	874	864
Fusion	(1)	25	34	41	58	82[2]	(1)	124[2]	(1)	172	230
All other energy	(1)	70	222	524	669	890	1,127	1,543	1,878	1,775	1,173
Geothermal	(1)	1	2	6	13	24[2]	(1)	149[2]	(1)	72	28
Solar	(1)	2	7	19	43	64[2]	(1)	321[2]	(1)	304	213
Conservation and utilization	(1)	(1)	137	435	528	687[2]	(1)	686[2]	(1)	413	251
All other sources	(1)	67	76	64	85	115[2]	(1)	387[2]	(1)	986	681

[1] Data not collected.

[2] Detailed data for 1977 and 1979 were estimated based upon (a) data actually reported in those years, (b) revised data for years which were reported on the 1978 and 1980 survey forms, and (c) adjustments due to new sample in 1981.

SOURCE: National Science Foundation

Table 48. Company funds for energy research and development by primary energy source: 1972-81

[Dollars in millions]

Primary energy source	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Total	(1)	$624	$857	$1,152	$1,316	$1,632	$1,796	$2,230	$2,599	$2,749
Fossil fuels	(1)	428[2]	503[2]	507[2]	523[2]	644	678	788	993	1,260
Oil	(1)	295	326[2]	327[2]	369[2]	436[3]	(1)	529[3]	(1)	751
Gas	(1)	(4)	(4)	(4)	52	73[3]	(1)	109[3]	(1)	(4)
Shale	(1)	12[2]	(4)	(4)	(4)	(4)	(4)[3]	(4)	(4)	(4)
Coal	(1)	42	56	77	80	98[3]	(1)	130[3]	(1)	241
Synthetic fossil fuels	(1)	(1)	(4)	(4)	48	64[3]	(1)	84[3]	(1)	130
Mining	(1)	(1)	(4)	(4)	7	5[3]	(1)	1[3]	(1)	24
Other	(1)	(1)	33	34	25	29[3]	(1)	45[3]	(1)	87
Other fossil fuels	(1)	(4)	(4)	(4)	(4)	(4)[3]	(1)	(4)[3]	(1)	16
Nuclear	(1)	135	157	160	198	217	217	169	150	152
Fission	(1)	127	146[2]	156	194	211[3]	(1)	167[3]	(1)	93
Fusion	(1)	7	11	4	4	6[3]	(1)	2[3]	(1)	59
All other energy	(1)	(4)	(4)	(4)	595	770	901	1,273	1,456	1,337
Geothermal	(1)	(4)	(4)	(4)	5	9[3]	(1)	122[3]	(1)	41
Solar	(1)	(4)	(4)	(4)	17	22[3]	(1)	251[3]	(1)	207
Conservation and utilization	(1)	(1)	129[2]	425[2]	511[2]	656[3]	(1)	681[3]	(1)	343
All other sources	(1)	59	62	46	62	83[3]	(1)	219[3]	(1)	746

[1] Data not collected.

[2] Revised by the National Science Foundation.

[3] Detailed data for 1977 and 1979 were estimated based upon (a) data actually reported in those years, (b) revised totals for those years which were reported on the 1978 and 1980 survey forms, and (c) adjustments due to new sample in 1981.

[4] Not separately available but included in total.

SOURCE: National Science Foundation.

Table 49. Full-time-equivalent number of R&D scientists and engineers by industry: January 1972-83

[In thousands]

Industry	SIC code	January											
		1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Total (January)		350.2	357.7	360.0	363.3	364.4	382.8	404.4	423.9	450.6	487.8	509.8	535.6
Total (Annual Average)		354.0	358.9	361.7	363.9	373.6	393.6	414.2	437.3	469.2	499.7	523.6	NA
Distribution by industry													
Food and kindred products	20	6.5	6.6	6.4	6.8	6.9	6.9	6.9	7.4	7.2	7.4	7.4	7.6
Textiles and apparel	22,23	1.8	1.9	1.8	1.8	1.7	1.8	1.7	1.8	(1)	2.0	1.9	1.9
Lumber, wood products, and furniture	24,25	1.8	1.9	2.1	2.3	2.1	2.1	2.0	1.8	1.7	1.6	(1)	1.5
Paper and allied products	26	4.9	4.9	4.9	5.0	5.2	6.3	6.5	7.1	7.4	8.0	8.4	8.3
Chemicals and allied products	28	41.0	40.9	41.8	45.2	44.4	46.4	48.3	50.0	51.4	54.7	61.6	67.1
Industrial chemicals	281-82,286	19.1	19.1	19.1	21.1	20.1	20.6	21.3	21.4	20.9	21.6	25.9	26.4
Drugs and medicines	283	13.1	13.0	14.0	15.6	16.6	17.8	19.5	20.8	21.6	23.3	25.6	30.0
Other chemicals	284-84,287-89	8.8	8.8	8.7	8.5	7.8	8.0	7.5	7.8	8.9	9.8	10.1	10.7
Petroleum refining and related industries	29	8.3	8.2	8.2	8.4	3.6	8.9	9.9	10.1	10.8	13.0	15.6	15.1
Rubber products	30	6.7	7.5	7.7	8.4	8.6	9.1	7.9	8.1	(1)	10.3	8.1	(1)
Stone, clay, and glass products	32	4.1	4.2	4.5	4.5	4.6	4.5	5.1	5.2	5.4	5.6	5.1	5.0
Primary metals	33	6.4	6.0	6.4	6.3	8.1	8.4	8.1	7.9	8.1	7.9	8.4	8.0
Ferrous metals and products	331-32,3398-99	3.4	3.2	3.3	3.3	3.9	3.9	4.2	4.3	4.7	4.8	5.2	5.1
Nonferrous metals and products	333-36	3.0	2.8	3.1	3.0	4.2	4.5	3.9	3.6	3.4	3.1	3.2	3.0
Fabricated metal products	34	6.6	6.7	7.3	7.4	6.8	7.1	7.0	6.8	7.8	7.6	8.2	7.3
Machinery	35	43.7	46.3	51.0	52.6	55.7	55.3	57.8	60.2	62.1	69.2	76.0	76.4
Office, computing, and accounting machines	357	(2)	30.1	34.5	36.1	38.1	37.7	38.9	40.9	41.8	43.7	48.1	49.6
Other machinery, except electrical	351-56,358-59	(3)	(3)	(3)	(3)	(3)	(3)	18.9	19.3	20.3	25.5	27.9	26.8
Electrical equipment	36	83.6	85.4	82.6	82.6	80.3	84.1	84.4	85.0	94.5	106.9	109.8	113.9
Radio and TV receiving equipment	365	2.1	1.4	1.3	1.0	1.1	.9	1.5	2.1	4.0	7.9	7.8	(1)
Communication equipment	366	53.2	45.3	42.0	40.2	37.4	38.0	39.0	40.4	42.4	44.2	45.9	47.7
Electronic components	367		9.4	9.6	10.6	10.2	13.0	14.2	14.0	16.1	22.8	24.4	26.4
Other electrical equipment	361-64,369	28.3	29.3	29.7	30.8	31.6	32.2	29.7	28.5	30.0	32.0	31.7	(1)
Motor vehicles and motor vehicles equipment	371	29.7	28.2	27.4	26.0	25.4	28.2	31.9	35.3	38.2	35.1	30.0	29.9
Other transportation equipment	373-75,379		1.7	1.8	1.9	1.7	1.9	1.9	2.0	1.5	1.4	1.2	1.4
Aircraft and missiles	372,376	70.8	72.1	70.6	67.5	66.9	72.0	82.0	86.5	85.9	95.2	91.1	96.5
Professional and scientific instruments	38	15.2	16.3	17.5	17.3	18.8	20.5	23.3	27.0	32.8	34.7	42.7	(1)
Scientific and mechanical measuring instruments	381-82	4.7	5.3	5.6	5.9	6.7	7.2	9.0	11.7	(1)	18.6	(1)	(1)
Optical, surgical, photographic, and other instruments	383-87	10.5	11.0	11.9	12.0	12.1	13.3	14.3	15.3	16.3	16.0	16.1	(1)
Other manufacturing industries	21,27,31,39	3.6	3.6	3.7	3.7	4.2	4.5	4.6	4.7	4.6	4.6	5.5	6.0
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	15.7	15.3	14.4	14.9	14.6	15.3	15.0	17.1	19.8	22.2	27.1	29.7

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to the 1972 survey.

[3] Data not tabulated at this level prior to the 1977 survey.

NA = Not available.

SOURCE: National Science Foundation

Table 50. R&D scientists and engineers per 1,000 employees by industry: 1971-82

Industry	SIC code	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Distribution by industry													
Total	....	26	24	24	25	26	27	27	27	27	27	29	32
Food and kindred products	20	7	7	7	7	7	7	7	7	6	5	6	6
Textiles and apparel	22,23	3	3	3	3	3	3	3	3	3	3	3	3
Lumber, wood products and furniture	24,25	7	6	7	7	7	7	7	7	6	6	(1)	(1)
Paper and allied products	26	9	8	8	8	10	12	12	14	14	14	16	16
Chemicals and allied products	28	41	39	39	40	41	40	42	43	42	42	44	51
Industrial chemicals	281-82,286	35	34	36	37	38	36	38	38	36	36	37	43
Drugs and medicines	283	65	60	57	57	59	64	52	65	62	60	66	76
Other chemicals	284-85,287-89	31	31	29	30	29	28	29	27	27	30	33	35
Petroleum refining and related industries	29	17	16	17	18	19	17	17	19	18	17	20	22
Rubber products	30	15	16	17	17	18	18	19	18	(1)	(1)	25	(1)
Stone, clay, and glass products	32	11	10	10	11	11	11	12	13	13	13	13	14
Primary metals	33	5	5	5	5	7	8	8	8	7	7	8	9
Ferrous metals and products	331-32,3398-99	4	4	4	4	5	5	5	6	6	6	6	8
Nonferrous metals and products	333-36	8	7	8	7	11	15	13	12	12	12	13	15
Fabricated metal products	34	11	10	11	11	12	12	12	12	12	14	15	15
Machinery	35	29	31	31	34	36	38	38	39	38	36	35	40
Office, computing, and accounting machines	357	(2)	66	65	69	76	79	78	79	75	72	71	69
Other machinery, except electrical	351-56,358-59	(3)	(3)	(3)	(3)	(3)	(3)	18	19	19	18	19	23
Electrical equipment	36	38	37	37	37	40	42	42	41	43	44	48	52
Radio and TV receiving equipment	365	35	26	20	18	16	15	17	22	29	35	51	(1)
Communication equipment	366	46	42	43	43	44	45	48	48	53	55	56	61
Electronic components	367		39	40	40	49	55	54	51	52	55	66	66
Other electrical equipment	361-64,369	32	31	31	32	36	38	35	32	32	32	34	(1)
Motor vehicles and motor vehicles equipment	371	20	23 22	22	24	25	25	24	26	26	30	30	32
Other transportation equipment	373-75,379		14	13	13	13	14	13	13	11	9	9	9
Aircraft and missiles	372,376	74	76	68	72	72	78	85	96	93	92	96	102
Professional and scientific instruments	38	33	33	34	35	38	41	41	42	41	39	46	(1)
Scientific and mechanical measuring instruments	381-82	31	31	33	35	41	45	45	50	(1)	(1)	(1)	(1)
Optical, surgical, photographic, and other instruments	383-87	33	34	35	35	37	38	41	44	45	48	47	(1)
Other manufacturing industries	21,27,31,39	7	6	6	6	7	8	7	9	7	7	7	8
Nonmanufacturing industries	07-17,41-67,737, 739,807,891	22	21	18	17	16	19	16	14	13	11	12	(1)

Note: The number of R&D scientists and engineers for 1982 is derived by dividing the arithmetic mean of scientists and engineers employed in January 1982 and January 1983 by the number of company employees in all activities in March 1982. Similar procedures were used in earlier years.

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to the 1972 survey.

[3] Data not tabulated at this level prior to the 1977 survey.

SOURCE: National Science Foundation.

TABLE 51. — R&D EXPENDITURES AT UNIVERSITIES AND COLLEGES, BY SOURCE OF FUNDS, CHARACTER OF WORK, AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1975-82

(DOLLARS IN THOUSANDS)

SOURCE, CHARACTER, AND FIELD	1975	1976	1977	1978 1/	1979	1980	1981	1982
TOTAL	3,408,691	3,729,007	4,066,953	4,624,673	5,361,408	6,060,118	6,818,343	7,260,637
SOURCE OF FUNDS:								
FEDERAL GOVERNMENT	2,288,070	2,511,867	2,726,126	3,058,734	3,595,271	4,093,586	4,559,049	4,749,264
STATE AND LOCAL GOVERNMENTS	331,646	363,746	373,943	414,389	470,073	493,649	540,050	585,559
INDUSTRY	112,952	123,145	138,807	169,623	192,753	235,522	287,550	325,594
INSTITUTIONAL FUNDS	417,425	445,590	514,275	622,646	729,731	828,774	983,445	1,097,602
ALL OTHER SOURCES	258,598	284,659	313,802	359,281	373,580	408,587	448,249	502,618
CHARACTER OF WORK: 2/								
BASIC RESEARCH	2,409,777	2,548,820	2,799,649	-	3,612,278	4,026,180	4,576,230	4,850,953
APPLIED RESEARCH AND DEVELOPMENT	998,914	1,180,187	1,267,304	-	1,749,130	2,033,938	2,242,113	2,409,684
FIELD:								
ENGINEERING 3/	380,912	431,727	498,473	601,062	768,407	864,040	959,989	1,024,514
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	46,286	45,523	60,645
CHEMICAL	-	-	-	-	-	67,559	83,215	83,265
CIVIL	-	-	-	-	-	88,604	108,189	108,288
ELECTRICAL	-	-	-	-	-	183,727	192,796	224,326
MECHANICAL	-	-	-	-	-	145,621	148,585	141,513
OTHER, N.E.C.	-	-	-	-	-	332,243	381,681	406,477
PHYSICAL SCIENCES	350,278	379,379	423,457	496,399	601,904	677,604	766,504	822,844
ASTRONOMY	26,607	26,294	32,361	36,782	48,459	58,741	67,391	73,296
CHEMISTRY	120,710	140,142	159,353	183,131	206,421	244,454	285,520	311,452
PHYSICS	173,510	183,050	201,655	235,099	292,033	322,057	356,944	363,263
OTHER, N.E.C.	29,451	29,893	30,088	41,387	54,991	52,352	56,649	74,833
ENVIRONMENTAL SCIENCES 3/	255,060	288,531	319,398	379,391	452,915	509,166	551,881	560,144
ATMOSPHERIC	-	-	-	-	-	68,361	78,351	85,705
EARTH SCIENCES	-	-	-	-	-	186,047	191,854	195,712
OCEANOGRAPHY	-	-	-	-	-	173,455	187,398	198,253
OTHER, N.E.C.	-	-	-	-	-	81,303	94,278	80,474
MATHEMATICAL/COMPUTER SCIENCES	85,306	86,994	107,875	126,178	176,398	192,736	222,028	244,466
MATHEMATICS	39,713	42,491	52,312	58,756	78,477	78,585	89,008	96,121
COMPUTER SCIENCES	45,593	44,503	55,563	67,422	97,921	114,151	133,020	148,345
LIFE SCIENCES	1,900,837	2,101,695	2,258,806	2,538,004	2,832,523	3,217,773	3,672,257	3,969,808
AGRICULTURAL SCIENCES	383,841	412,667	460,647	521,745	602,485	679,304	771,534	838,355
BIOLOGICAL SCIENCES	630,166	710,724	772,290	808,500	914,806	1,031,037	1,188,498	1,289,910
MEDICAL SCIENCES	811,383	897,376	950,907	1,128,652	1,237,556	1,414,356	1,599,409	1,721,004
OTHER, N.E.C.	75,447	80,728	74,962	79,107	77,676	93,076	112,816	120,539
PSYCHOLOGY	80,327	77,888	85,133	89,664	100,531	111,177	128,560	131,856
SOCIAL SCIENCES	256,116	262,261	268,087	277,497	295,138	341,551	372,195	354,035
ECONOMICS	55,949	65,447	72,124	79,129	83,089	90,162	99,711	94,735
POLITICAL SCIENCE	29,382	28,355	32,314	36,571	45,431	55,450	56,695	60,782
SOCIOLOGY	68,758	66,246	61,939	66,900	74,641	88,548	94,986	79,513
OTHER, N.E.C.	102,027	102,213	101,710	94,897	91,977	107,391	120,803	119,005
OTHER SCIENCES, N.E.C.	99,855	100,532	105,724	116,478	133,592	146,071	144,929	152,970

1/ ESTIMATED, BASED ON DATA COLLECTED FROM DOCTORATE-GRANTING INSTITUTIONS ONLY.
2/ DATA WERE NOT COLLECTED IN 1978.
3/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 52. — R&D EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS, BY SOURCE OF FUNDS, CHARACTER OF WORK, AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1975-82

(DOLLARS IN THOUSANDS)

SOURCE, CHARACTER, AND FIELD	1975	1976	1977	1978	1979	1980	1981	1982
TOTAL	3,338,409	3,656,888	3,987,885	4,540,256	5,271,643	5,958,697	6,697,267	7,134,296
SOURCE OF FUNDS:								
FEDERAL GOVERNMENT	2,241,149	2,465,396	2,677,463	3,004,930	3,534,215	4,027,566	4,479,724	4,668,864
STATE AND LOCAL GOVERNMENTS	325,209	356,451	365,569	406,509	461,534	483,694	529,033	570,970
INDUSTRY	110,098	120,087	135,031	165,512	189,300	231,255	281,149	318,741
INSTITUTIONAL FUNDS	409,468	436,795	502,930	610,827	717,502	815,013	968,235	1,082,835
ALL OTHER SOURCES	252,485	278,159	306,892	352,478	369,092	401,169	439,126	492,886
CHARACTER OF WORK: 1/								
BASIC RESEARCH	2,370,779	2,507,788	2,758,513	-	3,561,649	3,965,790	4,502,579	4,769,319
APPLIED RESEARCH AND DEVELOPMENT	967,630	1,149,100	1,229,372	-	1,709,994	1,992,907	2,194,688	2,364,977
FIELD:								
ENGINEERING 2/	377,107	425,182	490,931	591,962	761,142	856,186	951,883	1,016,347
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	45,743	44,920	59,773
CHEMICAL	-	-	-	-	-	66,878	82,987	83,104
CIVIL	-	-	-	-	-	86,663	106,068	106,323
ELECTRICAL	-	-	-	-	-	182,920	191,597	223,327
MECHANICAL	-	-	-	-	-	144,595	147,119	140,200
OTHER, N.E.C.	-	-	-	-	-	329,387	379,192	403,620
PHYSICAL SCIENCES	338,445	366,497	410,642	481,447	585,227	659,265	746,584	801,521
ASTRONOMY	26,394	26,094	32,117	36,505	47,969	58,087	66,746	72,662
CHEMISTRY	114,939	133,613	152,454	175,438	198,788	234,769	273,401	298,241
PHYSICS	169,310	179,013	197,861	230,678	286,738	315,902	350,576	356,796
OTHER, N.E.C.	27,802	27,777	28,210	38,826	51,732	50,507	55,861	73,822
ENVIRONMENTAL SCIENCES 2/	246,766	279,503	309,283	367,337	443,531	496,249	534,528	543,303
ATMOSPHERIC	-	-	-	-	-	66,137	75,303	83,613
EARTH SCIENCES	-	-	-	-	-	180,247	185,423	189,143
OCEANOGRAPHY	-	-	-	-	-	171,386	183,314	195,052
OTHER, N.E.C.	-	-	-	-	-	78,479	90,488	75,495
MATHEMATICAL/COMPUTER SCIENCES	82,316	84,661	104,046	121,675	172,417	188,044	216,952	237,053
MATHEMATICS	37,916	41,330	51,050	57,342	77,141	76,698	86,152	92,061
COMPUTER SCIENCES	44,400	43,331	52,996	64,333	95,276	111,346	130,800	144,992
LIFE SCIENCES	1,881,524	2,081,677	2,234,749	2,515,138	2,802,489	3,184,899	3,632,511	3,926,321
AGRICULTURAL SCIENCES	377,260	406,359	453,787	514,409	591,631	666,756	755,737	821,042
BIOLOGICAL SCIENCES	619,719	700,143	758,929	793,613	899,789	1,016,551	1,170,097	1,268,568
MEDICAL SCIENCES	809,763	895,759	947,629	1,128,652	1,234,837	1,410,708	1,596,510	1,718,814
OTHER, N.E.C.	74,782	79,416	74,404	78,464	76,232	90,884	110,167	117,897
PSYCHOLOGY	74,385	74,621	82,199	86,556	93,944	106,712	121,959	127,667
SOCIAL SCIENCES	242,790	248,467	254,749	264,351	283,183	324,002	350,091	332,632
ECONOMICS	54,030	64,356	70,825	74,332	80,780	87,259	96,608	92,865
POLITICAL SCIENCE	28,109	27,087	31,144	40,393	44,284	53,331	54,309	58,321
SOCIOLOGY	66,054	63,634	59,356	65,030	72,059	83,285	86,311	72,214
OTHER, N.E.C.	94,597	93,390	93,424	84,596	86,060	100,127	112,863	109,232
OTHER SCIENCES, N.E.C.	95,076	96,280	101,286	111,790	129,710	143,340	142,759	149,452

1/ DATA WERE NOT COLLECTED IN 1978.
2/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 53. — FEDERALLY FINANCED R&D EXPENDITURES AT UNIVERSITIES AND COLLEGES BY CHARACTER OF WORK AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1975-82

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1975	1976	1977	1978 1/	1979	1980	1981	1982
TOTAL	2,288,070	2,511,867	2,726,126	3,058,734	3,595,271	4,093,586	4,559,049	4,749,264
CHARACTER OF WORK: 2/								
BASIC RESEARCH.................	1,695,022	1,841,223	2,006,589	-	2,571,744	2,850,670	3,247,660	3,393,157
APPLIED RESEARCH AND DEVELOPMENT	593,048	670,644	719,537	-	1,023,527	1,242,916	1,311,389	1,356,107
FIELD:								
ENGINEERING 3/................	259,353	290,518	336,725	407,487	526,364	594,551	661,578	697,152
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	35,610	35,302	48,097
CHEMICAL	-	-	-	-	-	46,057	55,168	49,616
CIVIL	-	-	-	-	-	58,879	67,907	59,013
ELECTRICAL	-	-	-	-	-	139,302	145,122	173,503
MECHANICAL	-	-	-	-	-	99,239	102,460	96,973
OTHER, N.E.C.	-	-	-	-	-	215,464	255,619	269,950
PHYSICAL SCIENCES	284,992	305,407	338,782	392,346	490,680	554,455	618,612	649,670
ASTRONOMY	19,522	18,351	23,230	26,349	36,245	44,441	47,876	51,728
CHEMISTRY	92,716	107,867	121,453	138,001	156,516	189,287	216,630	231,627
PHYSICS	149,862	156,102	171,910	199,161	252,518	279,666	308,481	305,906
OTHER, N.E.C.	22,892	23,087	22,189	28,835	45,401	41,061	45,625	60,409
ENVIRONMENTAL SCIENCES 3/.....	180,643	211,822	238,591	275,080	329,154	371,862	392,342	391,510
ATMOSPHERIC	-	-	-	-	-	56,125	58,698	68,446
EARTH SCIENCES	-	-	-	-	-	129,660	128,490	126,309
OCEANOGRAPHY	-	-	-	-	-	133,509	145,586	153,715
OTHER, N.E.C.	-	-	-	-	-	52,568	59,568	43,040
MATHEMATICAL/COMPUTER SCIENCES	65,099	65,807	78,184	85,344	129,623	137,945	161,282	179,398
MATHEMATICS	31,224	32,882	40,638	44,130	60,431	61,028	67,839	72,030
COMPUTER SCIENCES	33,875	32,925	37,546	41,214	69,192	76,917	93,443	107,368
LIFE SCIENCES	1,237,878	1,380,846	1,473,984	1,626,413	1,818,779	2,093,749	2,363,543	2,493,092
AGRICULTURAL SCIENCES	112,864	122,538	132,772	155,349	184,676	211,285	233,613	254,691
BIOLOGICAL SCIENCES	457,093	522,172	575,129	590,560	664,675	762,897	866,297	921,875
MEDICAL SCIENCES	613,716	677,509	712,327	824,808	914,905	1,056,525	1,187,297	1,238,805
OTHER, N.E.C.	54,205	58,627	53,756	55,696	54,523	63,042	76,336	77,721
PSYCHOLOGY	61,686	59,367	63,648	63,996	72,257	81,053	92,451	89,105
SOCIAL SCIENCES	141,333	138,255	138,205	140,445	155,074	181,627	187,554	162,656
ECONOMICS	26,968	29,132	31,595	37,103	40,026	43,430	44,532	41,376
POLITICAL SCIENCE	12,280	11,966	14,926	15,888	20,561	23,676	23,398	22,602
SOCIOLOGY	45,041	41,115	37,854	40,597	47,144	57,140	56,500	46,151
OTHER, N.E.C.	57,044	56,042	53,830	46,857	47,343	57,381	63,124	52,527
OTHER SCIENCES, N.E.C.	57,086	59,845	58,007	67,623	73,340	78,344	81,687	86,681

1/ ESTIMATED, BASED ON DATA COLLECTED FROM DOCTORATE-GRANTING INSTITUTIONS ONLY.
2/ DATA WERE NOT COLLECTED IN 1978.
3/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 54. -- FEDERALLY FINANCED R&D EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS BY CHARACTER OF WORK AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1975-82

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1975	1976	1977	1978	1979	1980	1981	1982
TOTAL	2,241,149	2,465,396	2,677,463	3,004,930	3,534,215	4,027,566	4,479,724	4,668,864
CHARACTER OF WORK: 1/								
BASIC RESEARCH	1,669,162	1,814,631	1,980,963	-	2,533,971	2,808,782	3,196,594	3,336,538
APPLIED RESEARCH AND DEVELOPMENT	571,987	650,765	696,500	-	1,000,244	1,218,784	1,283,130	1,332,326
FIELD:								
ENGINEERING 2/	256,486	286,609	332,283	402,102	520,978	588,798	656,231	691,967
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	35,107	34,747	47,284
CHEMICAL	-	-	-	-	-	45,504	55,051	49,562
CIVIL	-	-	-	-	-	57,339	66,407	57,602
ELECTRICAL	-	-	-	-	-	138,772	144,320	172,838
MECHANICAL	-	-	-	-	-	98,552	101,485	96,253
OTHER, N.E.C.	-	-	-	-	-	213,524	254,221	268,428
PHYSICAL SCIENCES	277,357	296,826	330,554	383,004	478,634	542,015	604,909	635,475
ASTRONOMY	19,338	18,208	23,028	26,120	35,765	43,875	47,319	51,182
CHEMISTRY	88,700	103,129	116,852	132,921	151,781	183,128	208,638	223,063
PHYSICS	146,800	153,078	168,987	195,776	248,051	274,676	303,695	300,991
OTHER, N.E.C.	22,519	22,411	21,687	28,187	43,037	40,336	45,257	60,239
ENVIRONMENTAL SCIENCES 2/	175,458	205,968	231,765	267,196	322,486	362,609	381,582	381,011
ATMOSPHERIC	-	-	-	-	-	54,019	56,305	66,579
EARTH SCIENCES	-	-	-	-	-	125,454	123,861	121,759
OCEANOGRAPHY	-	-	-	-	-	132,339	144,275	152,567
OTHER, N.E.C.	-	-	-	-	-	50,797	57,141	40,106
MATHEMATICAL/COMPUTER SCIENCES	63,327	64,638	76,413	83,412	128,131	136,162	158,720	175,992
MATHEMATICS	30,120	32,334	39,972	43,407	59,685	59,939	65,981	69,719
COMPUTER SCIENCES	33,207	32,304	36,441	40,005	68,446	76,223	92,739	106,273
LIFE SCIENCES	1,223,025	1,366,069	1,457,035	1,607,969	1,796,934	2,069,282	2,332,418	2,458,946
AGRICULTURAL SCIENCES	107,442	117,413	127,891	150,105	176,039	200,966	220,363	240,696
BIOLOGICAL SCIENCES	449,496	514,696	565,558	577,688	653,701	752,096	851,890	905,132
MEDICAL SCIENCES	612,363	676,213	710,116	824,808	913,824	1,054,815	1,185,538	1,236,925
OTHER, N.E.C.	53,724	57,747	53,470	55,368	53,370	61,405	74,627	76,173
PSYCHOLOGY	57,379	56,846	61,504	61,844	66,684	77,760	87,834	86,612
SOCIAL SCIENCES	133,940	131,522	132,864	135,209	148,928	174,416	177,564	154,072
ECONOMICS	25,558	28,560	30,870	35,726	38,572	42,173	43,214	40,770
POLITICAL SCIENCE	11,616	11,531	14,410	17,025	20,169	23,093	22,828	21,918
SOCIOLOGY	43,355	39,777	36,600	39,648	45,922	54,197	52,165	42,975
OTHER, N.E.C.	53,411	51,654	50,984	42,810	44,265	54,953	59,357	48,409
OTHER SCIENCES, N.E.C.	54,177	56,918	55,045	64,194	71,440	76,524	80,466	84,789

1/ DATA WERE NOT COLLECTED IN 1978.
2/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 55. — CAPITAL EXPENDITURES AT UNIVERSITIES AND COLLEGES BY SCIENCE/ENGINEERING FIELD AND SOURCE OF FUNDS: FISCAL YEARS 1975-82 1/

(DOLLARS IN THOUSANDS)

FIELD	1975	1976	1977	1979	1980	1981	1982
ALL SOURCES, TOTAL	1,018,773	1,043,153	960,014	696,218	794,512	952,211	973,203
ENGINEERING	118,315	81,678	87,718	87,128	89,297	103,329	144,990
PHYSICAL SCIENCES	80,642	73,755	65,216	64,685	77,154	87,813	82,104
ENVIRONMENTAL SCIENCES	35,278	49,304	28,351	25,153	36,208	35,026	42,447
MATHEMATICAL/COMPUTER SCIENCES	15,227	24,684	25,136	27,282	32,318	30,517	35,945
LIFE SCIENCES	669,093	706,961	642,493	428,293	459,057	597,597	591,136
PSYCHOLOGY	11,710	9,131	12,702	7,060	17,982	10,991	13,246
SOCIAL SCIENCES	50,904	44,303	31,798	21,358	35,073	45,125	31,248
OTHER SCIENCES, N.E.C.	37,604	53,337	66,600	35,259	47,423	41,813	32,087
FEDERAL SOURCES, TOTAL	270,083	206,890	195,519	164,460	149,563	153,798	118,996
ENGINEERING	64,019	20,200	17,219	20,927	20,438	17,601	18,246
PHYSICAL SCIENCES	18,862	19,195	21,894	32,186	22,463	25,529	20,132
ENVIRONMENTAL SCIENCES	5,960	6,428	9,307	8,220	8,033	6,867	4,479
MATHEMATICAL/COMPUTER SCIENCES	2,584	2,052	1,882	2,983	5,653	4,944	5,254
LIFE SCIENCES	169,459	153,570	137,369	90,796	86,105	89,409	66,509
PSYCHOLOGY	2,245	1,967	2,398	1,740	2,002	1,580	1,110
SOCIAL SCIENCES	2,755	1,806	2,109	2,076	1,528	6,376	1,407
OTHER SCIENCES, N.E.C.	4,199	1,672	3,341	5,532	3,341	1,492	1,859
OTHER SOURCES, TOTAL	748,690	836,263	764,495	531,758	644,949	798,413	854,207
ENGINEERING	54,296	61,478	70,499	66,201	68,859	85,728	126,744
PHYSICAL SCIENCES	61,780	54,560	43,322	32,499	54,691	62,284	61,972
ENVIRONMENTAL SCIENCES	29,318	42,876	19,044	16,933	28,175	28,159	37,968
MATHEMATICAL/COMPUTER SCIENCES	12,643	22,632	23,254	24,299	26,665	25,573	30,691
LIFE SCIENCES	499,634	553,391	505,124	337,497	372,952	508,188	524,627
PSYCHOLOGY	9,465	7,164	10,304	5,320	15,980	9,411	12,136
SOCIAL SCIENCES	48,149	42,497	29,689	19,282	33,545	38,749	29,841
OTHER SCIENCES, N.E.C.	33,405	51,665	63,259	29,727	44,082	40,321	30,228

1/ DATA WERE NOT COLLECTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 56. — CAPITAL EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS BY SCIENCE/ENGINEERING FIELD AND SOURCE OF FUNDS: FISCAL YEARS 1975-82 1/

(DOLLARS IN THOUSANDS)

FIELD	1975	1976	1977	1979	1980	1981	1982
ALL SOURCES, TOTAL	898,131	976,246	897,072	667,981	756,159	907,607	935,062
ENGINEERING	63,215	69,910	84,561	84,175	85,266	97,888	142,207
PHYSICAL SCIENCES	69,150	65,211	57,268	58,718	71,704	82,087	79,618
ENVIRONMENTAL SCIENCES	26,779	42,731	26,129	24,066	33,840	33,407	41,380
MATHEMATICAL/COMPUTER SCIENCES	11,530	18,278	21,424	23,191	25,825	24,469	26,435
LIFE SCIENCES	646,227	687,351	607,273	421,893	449,789	582,291	575,505
PSYCHOLOGY	10,419	8,146	7,931	6,210	16,901	9,360	12,567
SOCIAL SCIENCES	44,646	37,887	30,162	19,313	32,507	43,775	30,228
OTHER SCIENCES, N.E.C.	26,165	46,732	62,324	30,415	40,327	34,330	27,122
FEDERAL SOURCES, TOTAL	212,307	196,921	188,236	160,300	144,205	148,348	114,504
ENGINEERING	13,121	14,827	16,860	20,524	20,061	17,170	17,903
PHYSICAL SCIENCES	18,181	18,352	20,815	30,912	21,639	24,795	19,673
ENVIRONMENTAL SCIENCES	5,726	6,240	9,031	7,781	7,600	6,425	4,167
MATHEMATICAL/COMPUTER SCIENCES	1,669	1,832	1,707	2,749	3,522	2,908	3,417
LIFE SCIENCES	167,495	150,792	132,898	89,298	84,857	87,876	65,122
PSYCHOLOGY	2,092	1,809	1,668	1,542	1,846	1,499	1,041
SOCIAL SCIENCES	2,162	1,518	2,011	2,011	1,480	6,249	1,355
OTHER SCIENCES, N.E.C.	1,861	1,551	3,246	5,483	3,200	1,426	1,826
OTHER SOURCES, TOTAL	685,824	779,325	708,836	507,681	611,954	759,259	820,558
ENGINEERING	50,094	55,083	67,701	63,651	65,205	80,718	124,304
PHYSICAL SCIENCES	50,969	46,859	36,453	27,806	50,065	57,292	59,945
ENVIRONMENTAL SCIENCES	21,053	36,491	17,098	16,285	26,240	26,982	37,213
MATHEMATICAL/COMPUTER SCIENCES	9,861	16,446	19,717	20,442	22,303	21,561	23,018
LIFE SCIENCES	478,732	536,559	474,375	332,595	364,932	494,415	510,383
PSYCHOLOGY	8,327	6,337	6,263	4,668	15,055	7,861	11,526
SOCIAL SCIENCES	42,484	36,369	28,151	17,302	31,027	37,526	28,873
OTHER SCIENCES, N.E.C.	24,304	45,181	59,078	24,932	37,127	32,904	25,296

1/ DATA WERE NOT COLLECTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 57. R&D EXPENDITURES AT UNIVERSITY-ADMINISTERED FEDERALLY-FUNDED RESEARCH AND DEVELOPMENT CENTERS: FISCAL YEARS 1968, 1970, AND 1972-82

(DOLLARS IN THOUSANDS)

FISCAL YEAR	ALL FFRDC'S	17 MATCHED FFRDC'S 1/
1968	718,930	635,674
1970	736,847	656,575
1972	753,243	687,028
1973	816,923	748,867
1974	865,098	790,649
1975	986,736	911,100
1976	1,146,712	1,066,520
1977	1,383,814	1,296,618
1978	1,716,911	1,712,657
1979	1,934,797	1,928,563
1980	2,245,773	2,239,054
1981	2,485,853	2,478,077
1982	2,478,721	2,470,196

1/ THESE 17 FFRDC'S WERE IN EXISTENCE THROUGHOUT THE PERIOD.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 58. — R&D EXPENDITURES AT UNIVERSITY-ADMINISTERED FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS BY CHARACTER OF WORK AND SCIENCE/ENGINEERING FIELD: FISCAL YEARS 1975-82

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1975	1976	1977	1978	1979	1980	1981	1982
TOTAL	986,736	1,146,712	1,383,814	1,716,911	1,934,797	2,245,773	2,485,853	2,478,721
CHARACTER OF WORK: 1/								
BASIC RESEARCH	308,981	358,811	402,168	-	718,303	785,774	863,179	869,701
APPLIED RESEARCH AND DEVELOPMENT	677,755	787,901	981,646	-	1,216,494	1,459,999	1,622,674	1,609,020
FIELD:								
ENGINEERING 2/	275,682	299,683	380,420	522,213	561,083	644,910	656,426	636,158
AERONAUTICAL AND ASTRONAUTICAL	-	-	-	-	-	24,778	60,339	59,409
CHEMICAL	-	-	-	-	-	38,406	47,454	44,988
CIVIL	-	-	-	-	-	18,874	16,052	17,952
ELECTRICAL	-	-	-	-	-	200,981	169,059	171,470
MECHANICAL	-	-	-	-	-	135,958	185,448	181,017
OTHER, N.E.C.	-	-	-	-	-	226,013	178,074	161,322
PHYSICAL SCIENCES	523,160	622,887	736,802	854,455	1,003,562	1,127,323	1,270,539	1,315,626
ASTRONOMY	31,153	32,452	41,500	38,452	46,099	59,025	67,578	65,885
CHEMISTRY	69,658	96,268	111,564	97,529	101,142	150,540	167,148	161,548
PHYSICS	322,464	376,632	447,110	568,040	584,519	829,217	950,865	982,245
OTHER, N.E.C.	99,885	117,535	136,628	150,434	271,802	88,541	84,948	105,948
ENVIRONMENTAL SCIENCES 2/	63,175	77,476	100,981	128,217	141,100	174,724	186,526	157,962
ATMOSPHERIC	-	-	-	-	-	35,703	48,433	55,325
EARTH SCIENCES	-	-	-	-	-	59,990	42,715	37,334
OCEANOGRAPHY	-	-	-	-	-	4,306	14,276	12,201
OTHER, N.E.C.	-	-	-	-	-	74,725	81,102	53,102
MATHEMATICAL/COMPUTER SCIENCES	62,416	71,641	78,584	119,203	126,850	162,114	226,627	219,197
MATHEMATICS	17,715	22,063	15,358	8,100	6,614	31,089	38,561	42,091
COMPUTER SCIENCES	44,701	49,578	63,226	111,103	120,236	131,025	188,066	177,106
LIFE SCIENCES	42,284	50,198	57,949	58,439	73,441	76,889	85,164	84,269
AGRICULTURAL SCIENCES	0	0	354	1,206	1,551	645	570	2,528
BIOLOGICAL SCIENCES	31,661	38,253	43,569	48,154	62,659	57,006	66,406	62,180
MEDICAL SCIENCES	4,963	5,081	4,761	7,963	7,179	8,194	8,453	8,575
OTHER, N.E.C.	5,660	6,864	9,265	1,116	2,052	11,044	9,735	10,986
PSYCHOLOGY	306	92	87	103	110	135	147	155
SOCIAL SCIENCES	795	1,288	3,301	5,119	5,861	17,449	20,984	21,412
ECONOMICS	795	1,277	3,280	3,875	3,735	9,657	6,002	4,556
POLITICAL SCIENCE	0	0	0	1,244	2,126	2,422	3,439	3,428
SOCIOLOGY	0	0	0	0	0	1,500	2,259	2,487
OTHER, N.E.C.	0	11	21	0	0	3,870	9,284	10,941
OTHER SCIENCES, N.E.C.	18,918	23,447	25,690	29,162	22,790	42,229	39,440	43,942

1/ DATA WERE NOT COLLECTED IN 1978.
2/ DETAIL NOT SEPARATELY AVAILABLE PRIOR TO 1980.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 59. — SCIENCE/ENGINEERING POSTDOCTORATES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1975-77 AND 1979-82 1/

FIELD	NUMBER							AVERAGE ANNUAL PERCENT CHANGE		
	1975	1976	1977	1979	1980	1981	1982	1975-81	1981-82	1975-82
TOTAL, ALL FIELDS	16,832	18,452	19,487	18,086	18,411	19,646	19,733	2.6	0.4	2.3
ENGINEERING	1,167	1,218	1,245	1,067	979	1,041	979	-1.9	-6.0	-2.5
AEROSPACE	43	36	46	32	20	14	25	-17.1	78.6	-7.5
AGRICULTURAL	26	32	20	25	9	9	6	-16.2	-33.3	-18.9
BIOMEDICAL	41	55	73	32	28	34	30	-3.1	-11.8	-4.4
CHEMICAL	208	221	210	192	183	171	175	-3.2	2.3	-2.4
CIVIL	97	105	156	128	125	108	108	1.8	.0	1.5
ELECTRICAL	170	176	171	142	121	191	176	2.0	-7.9	.5
ENGINEERING SCIENCE	114	99	91	75	79	87	77	-4.4	-11.5	-5.5
INDUSTRIAL	41	15	20	7	16	13	9	-17.4	-30.8	-19.5
MECHANICAL	120	181	161	143	137	131	131	1.5	.0	1.3
METALLURGICAL/MATERIALS	210	213	209	209	172	193	166	-1.4	-14.0	-3.3
MINING	13	16	14	5	3	16	10	3.5	-37.5	-3.7
NUCLEAR	41	32	21	20	22	26	18	-7.3	-30.8	-11.1
PETROLEUM	1	2	5	6	6	2	4	12.2	100.0	21.9
ENGINEERING, N.E.C.	42	35	48	51	58	46	44	1.5	-4.3	.7
PHYSICAL SCIENCES	3,932	4,033	4,196	4,020	4,261	4,461	4,280	2.1	-4.1	1.2
ASTRONOMY	115	140	167	129	141	132	148	2.3	12.1	3.7
CHEMISTRY	2,522	2,610	2,658	2,604	2,710	2,870	2,806	2.2	-2.2	1.5
PHYSICS	1,288	1,281	1,369	1,285	1,395	1,444	1,324	1.9	-8.3	.4
PHYSICAL SCIENCES, N.E.C.	7	2	2	2	15	15	2	13.5	-86.7	-16.4
ENVIRONMENTAL SCIENCES	294	389	376	318	307	338	334	2.4	-1.2	1.8
ATMOSPHERIC SCIENCES	37	48	49	34	43	46	32	3.7	-30.4	-2.1
GEOSCIENCES	181	272	242	219	194	213	216	2.8	1.4	2.6
OCEANOGRAPHY	57	56	64	54	57	67	78	2.7	16.4	4.6
ENVIRONMENTAL SCIENCES, N.E.C.	19	13	21	11	13	12	8	-7.4	-33.3	-11.6
MATHEMATICAL/COMPUTER SCIENCES	167	190	145	200	205	147	240	-2.1	63.3	5.3
COMPUTER SCIENCE	55	79	75	75	62	48	57	-2.2	18.8	.5
MATHEMATICS AND APPLIED MATHEMATICS	85	88	54	102	122	88	169	.6	92.0	10.3
STATISTICS	27	23	16	23	21	11	14	-13.9	27.3	-9.0
LIFE SCIENCES	10,615	11,880	12,768	11,627	11,747	12,856	13,090	3.2	1.8	3.0
AGRICULTURAL SCIENCES	260	332	297	215	239	284	283	1.5	-.4	1.2
BIOLOGICAL SCIENCES	5,801	6,248	6,537	6,805	7,058	7,662	7,775	4.7	1.5	4.3
ANATOMY	197	177	218	256	250	261	280	4.8	7.3	5.2
BIOCHEMISTRY	1,351	1,419	1,398	1,511	1,548	1,673	1,645	3.6	-1.7	2.9
BIOLOGY	790	852	868	978	1,002	884	952	1.9	7.7	2.7
BIOMETRY/EPIDEMIOLOGY	23	37	65	68	72	64	53	18.6	-17.2	12.7
BIOPHYSICS	206	220	219	103	154	156	131	-4.5	-16.0	-6.3
BOTANY	174	179	184	163	220	240	298	5.5	24.2	8.0
CELL BIOLOGY	235	276	278	328	387	506	487	13.6	-3.8	11.0
ECOLOGY	31	8	18	18	22	44	28	6.0	-36.4	-1.4
ENTOMOLOGY/PARASITOLOGY	139	123	119	104	119	133	119	-.7	-10.5	-2.2
GENETICS	199	208	209	231	251	290	311	6.5	7.2	6.6
MICROBIOLOGY	703	801	914	869	879	984	1,043	5.8	6.0	5.8
NUTRITION	160	170	172	170	129	171	138	1.1	-19.3	-2.1
PATHOLOGY	349	370	428	429	477	468	544	5.0	16.2	6.5
PHARMACOLOGY	481	557	617	633	624	755	796	7.8	5.4	7.5
PHYSIOLOGY	508	577	609	678	668	758	674	6.9	-11.1	4.1
ZOOLOGY	211	230	182	218	209	221	223	.8	.9	.8
BIOSCIENCES, N.E.C.	44	44	39	48	47	54	53	3.5	-1.9	2.7
HEALTH SCIENCES	4,554	5,300	5,934	4,607	4,450	4,910	5,032	1.3	2.5	1.4
ANESTHESIOLOGY	95	64	75	62	54	66	72	-5.9	9.1	-3.9
CANCER/ONCOLOGY	86	120	130	110	133	119	98	5.6	-17.6	1.9
CARDIOLOGY	484	497	502	298	334	333	384	-6.0	15.3	-3.3
DENTISTRY	28	73	330	119	86	143	251	31.2	75.5	36.8
ENDOCRINOLOGY	138	208	202	105	120	150	142	1.4	-5.3	.4
GASTROENTEROLOGY	184	168	198	103	123	113	124	-7.8	9.7	-5.5
HEMATOLOGY	197	271	248	151	148	153	153	-4.1	.0	-3.5
NEUROLOGY	212	242	313	327	346	352	323	8.8	-8.2	6.2
NURSING	16	1	0	7	9	8	0	-10.9	-100.0	-100.0
OBSTETRICS/GYNECOLOGY	167	182	167	143	122	113	105	-6.3	-7.1	-6.4
OPHTHALMOLOGY	104	163	186	138	122	144	151	5.6	4.9	5.5
OTORHINOLARYNGOLOGY	42	41	30	35	46	41	35	-.4	-14.6	-2.6
PEDIATRICS	472	532	514	511	433	587	551	3.7	-6.1	2.2
PHARMACEUTICAL SCIENCES	201	202	237	235	233	243	238	3.2	-2.1	2.4
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	88	150	113	112	161	135	152	7.4	12.6	8.1
PSYCHIATRY	279	281	329	292	296	292	292	.8	.0	.7
PULMONARY DISEASE	152	207	228	143	127	122	143	-3.6	17.2	-.9
RADIOLOGY	174	182	190	138	156	155	185	-1.9	19.4	.9
SPEECH PATHOLOGY/AUDIOLOGY	19	19	31	35	16	16	7	-2.8	-56.3	-13.3
SURGERY	313	406	450	281	308	307	340	-.3	10.7	1.2
VETERINARY SCIENCES	42	63	83	22	52	31	49	-4.9	58.1	2.2
CLINICAL MEDICINE, N.E.C.	1,028	1,191	1,315	1,145	924	1,177	1,132	2.3	-3.8	1.4
HEALTH RELATED, N.E.C.	33	37	63	95	101	110	105	22.3	-4.5	18.0
PSYCHOLOGY	391	398	399	454	474	471	523	3.2	11.0	4.2
SOCIAL SCIENCES	266	344	358	400	438	332	287	3.8	-13.6	1.1
AGRICULTURAL ECONOMICS	28	30	28	6	8	6	10	-22.6	66.7	-13.7
ANTHROPOLOGY	33	45	53	41	40	30	34	-1.6	13.3	.4
ECONOMICS (EXCEPT AGRICULTURAL)	44	57	65	99	146	30	13	-6.2	-56.7	-16.0
GEOGRAPHY	7	12	9	5	15	23	5	21.9	-78.3	-4.7
HISTORY AND PHILOSOPHY OF SCIENCE	6	12	22	11	15	21	14	23.2	-33.3	12.9
LINGUISTICS	19	32	29	30	54	47	47	16.3	.0	13.8
POLITICAL SCIENCE	18	28	27	29	30	46	44	16.9	-4.3	13.6
SOCIOLOGY	89	114	98	115	99	90	89	.2	-1.1	.0
SOCIOLOGY/ANTHROPOLOGY	1	0	1	4	3	0	2	-100.0	**	10.4
SOCIAL SCIENCES, N.E.C.	21	14	26	60	28	39	29	10.9	-25.6	4.7

1/ DATA ON POSTDOCTORATES WERE NOT COLLECTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 60. — SCIENCE/ENGINEERING POSTDOCTORATES SUPPORTED BY FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1975-77 AND 1979-82 1/

FIELD	NUMBER							AVERAGE ANNUAL PERCENT CHANGE		
	1975	1976	1977	1979	1980	1981	1982	1975-81	1981-82	1975-82
TOTAL, ALL FIELDS	11,914	13,055	13,328	13,458	13,651	14,592	14,041	3.4	-3.8	2.4
ENGINEERING	813	875	932	769	689	745	671	-1.4	-9.9	-2.7
AEROSPACE	24	31	39	27	19	11	19	-12.2	72.7	-3.3
AGRICULTURAL	17	15	9	11	4	3	2	-25.1	-33.3	-26.3
BIOMEDICAL	29	38	47	30	24	29	25	.0	-13.8	-2.1
CHEMICAL	117	151	159	128	120	107	100	-1.5	-6.5	-2.2
CIVIL	54	78	102	83	91	80	66	6.8	-17.5	2.9
ELECTRICAL	128	131	140	100	79	150	118	2.7	-21.3	-1.2
ENGINEERING SCIENCE	106	87	74	66	61	59	66	-9.3	11.9	-6.5
INDUSTRIAL	24	9	8	4	12	10	3	-13.6	-70.0	-25.7
MECHANICAL	89	120	120	112	86	85	95	-.8	11.8	.9
METALLURGICAL/MATERIALS	159	159	171	149	129	149	121	-1.1	-18.8	-3.8
MINING	11	15	13	5	3	15	1	5.3	-93.3	-29.0
NUCLEAR	27	17	10	6	14	17	15	-7.4	-11.8	-8.1
PETROLEUM	0	2	4	6	2	2	3	**	50.0	**
ENGINEERING, N.E.C.	28	22	36	42	45	28	37	.0	32.1	4.1
PHYSICAL SCIENCES	3,114	3,266	3,417	3,317	3,596	3,804	3,598	3.4	-5.4	2.1
ASTRONOMY	86	106	126	100	123	119	135	5.6	13.4	6.7
CHEMISTRY	1,889	2,035	2,111	2,147	2,255	2,471	2,307	4.6	-6.6	2.9
PHYSICS	1,138	1,124	1,179	1,070	1,207	1,214	1,154	1.1	-4.9	.2
PHYSICAL SCIENCES, N.E.C.	1	1	1	0	11	0	2	-100.0	**	10.4
ENVIRONMENTAL SCIENCES	223	297	307	256	252	288	254	4.4	-11.8	1.9
ATMOSPHERIC SCIENCES	34	46	46	32	42	45	28	4.8	-37.8	-2.7
GEOSCIENCES	136	209	204	175	156	181	163	4.9	-9.9	2.6
OCEANOGRAPHY	41	38	47	41	44	50	58	3.4	16.0	5.1
ENVIRONMENTAL SCIENCES, N.E.C.	12	4	10	8	10	12	5	.0	-58.3	-11.8
MATHEMATICAL/COMPUTER SCIENCES	70	89	91	102	90	84	71	3.1	-15.5	.2
COMPUTER SCIENCE	41	54	65	60	51	28	32	-6.2	14.3	-3.5
MATHEMATICS AND APPLIED MATHEMATICS	17	29	21	31	34	49	32	19.3	-34.7	9.5
STATISTICS	12	6	5	11	5	7	7	-8.6	.0	-7.4
LIFE SCIENCES	7,334	8,113	8,186	8,501	8,460	9,119	8,914	3.7	-2.2	2.8
AGRICULTURAL SCIENCES	120	191	174	128	152	194	168	8.3	-13.4	4.9
BIOLOGICAL SCIENCES	4,402	4,847	4,923	5,416	5,521	5,907	5,834	5.0	-1.2	4.1
ANATOMY	148	136	157	201	191	199	199	5.1	.0	4.3
BIOCHEMISTRY	1,102	1,144	1,136	1,205	1,230	1,300	1,280	2.8	-1.5	2.2
BIOLOGY	544	677	634	764	803	740	721	5.3	-2.6	4.1
BIOMETRY/EPIDEMIOLOGY	18	29	42	54	58	60	41	22.2	-31.7	12.5
BIOPHYSICS	177	195	198	85	128	123	117	-5.9	-4.9	-5.7
BOTANY	80	94	104	104	159	182	213	14.7	17.0	15.0
CELL BIOLOGY	196	232	213	247	296	398	373	12.5	-6.3	9.6
ECOLOGY	27	7	14	17	19	33	22	3.4	-33.3	-2.9
ENTOMOLOGY/PARASITOLOGY	75	85	82	78	88	102	88	5.3	-13.7	2.3
GENETICS	154	161	163	205	187	193	231	3.8	19.7	6.0
MICROBIOLOGY	517	594	658	694	692	751	787	6.4	4.8	6.2
NUTRITION	101	102	118	130	86	119	86	2.8	-27.7	-2.3
PATHOLOGY	262	280	309	352	355	309	353	2.8	14.2	4.4
PHARMACOLOGY	403	449	479	520	513	582	588	6.3	1.0	5.5
PHYSIOLOGY	402	475	475	555	526	603	525	7.0	-12.9	3.9
ZOOLOGY	174	169	123	169	150	174	174	.0	.0	.0
BIOSCIENCES, N.E.C.	22	18	18	36	40	39	36	10.0	-7.7	7.3
HEALTH SCIENCES	2,812	3,075	3,089	2,957	2,787	3,018	2,912	1.2	-3.5	.5
ANESTHESIOLOGY	37	43	33	29	29	21	34	-9.0	61.9	-1.2
CANCER/ONCOLOGY	70	95	76	97	109	90	83	4.3	-7.8	2.5
CARDIOLOGY	289	253	236	167	194	171	207	-8.4	21.1	-4.7
DENTISTRY	10	37	56	43	44	50	54	30.8	8.0	27.2
ENDOCRINOLOGY	93	127	113	71	79	117	101	3.9	-13.7	1.2
GASTROENTEROLOGY	101	86	95	41	55	85	83	-2.8	-2.4	-2.8
HEMATOLOGY	140	175	161	111	103	113	130	-3.5	15.0	-1.1
NEUROLOGY	166	172	204	237	267	232	220	5.7	-5.2	4.1
NURSING	16	1	0	6	9	8	0	-10.9	-100.0	-100.0
OBSTETRICS/GYNECOLOGY	78	77	75	55	51	45	51	-8.8	13.3	-5.9
OPHTHALMOLOGY	64	108	132	93	72	95	86	6.8	-9.5	4.3
OTORHINOLARYNGOLOGY	31	17	17	21	24	23	29	-4.9	26.1	-.9
PEDIATRICS	289	312	242	310	230	329	279	2.2	-15.2	-.5
PHARMACEUTICAL SCIENCES	175	169	174	194	201	189	159	1.3	-15.9	-1.4
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	71	94	75	73	121	89	86	3.8	-3.4	2.8
PSYCHIATRY	196	167	213	242	202	210	209	1.2	-.5	.9
PULMONARY DISEASE	76	103	98	82	61	76	75	.0	-1.3	-.2
RADIOLOGY	125	155	114	98	97	123	116	-.3	-5.7	-1.1
SPEECH PATHOLOGY/AUDIOLOGY	15	17	17	31	14	15	7	.0	-53.3	-10.3
SURGERY	173	206	208	165	181	174	150	.1	-13.8	-2.0
VETERINARY SCIENCES	27	31	46	13	36	18	22	-6.5	22.2	-2.9
CLINICAL MEDICINE, N.E.C.	557	608	651	710	541	667	662	3.0	-.7	2.5
HEALTH RELATED, N.E.C.	13	22	53	68	67	78	69	34.8	-11.5	26.9
PSYCHOLOGY	222	255	240	282	302	372	393	9.0	5.6	8.5
SOCIAL SCIENCES	138	160	155	231	262	180	140	4.5	-22.2	.2
AGRICULTURAL ECONOMICS	21	23	7	3	6	3	3	-27.7	.0	-24.3
ANTHROPOLOGY	19	27	24	28	31	20	22	.9	10.0	2.1
ECONOMICS (EXCEPT AGRICULTURAL)	15	14	12	36	84	19	8	4.0	-57.9	-8.6
GEOGRAPHY	2	1	4	2	6	2	3	.0	50.0	6.0
HISTORY AND PHILOSOPHY OF SCIENCE	1	1	6	2	5	7	5	38.3	-28.6	25.8
LINGUISTICS	6	8	7	6	19	7	9	2.6	28.6	6.0
POLITICAL SCIENCE	3	11	14	15	9	40	15	54.0	-62.5	25.8
SOCIOLOGY	53	66	71	94	82	73	67	5.5	-8.2	3.4
SOCIOLOGY/ANTHROPOLOGY	0	0	0	4	3	0	1	**	**	**
SOCIAL SCIENCES, N.E.C.	18	9	10	41	17	9	7	-10.9	-22.2	-12.6

1/ DATA ON POSTDOCTORATES WERE NOT COLLECTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 61. — SCIENCE/ENGINEERING POSTDOCTORATES SUPPORTED BY NON-FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1975-77 AND 1979-82 1/

FIELD	NUMBER							AVERAGE ANNUAL PERCENT CHANGE		
	1975	1976	1977	1979	1980	1981	1982	1975-81	1981-82	1975-82
TOTAL, ALL FIELDS	4,918	5,397	6,159	4,628	4,760	5,054	5,692	.5	12.6	2.1
ENGINEERING	354	343	313	298	290	296	308	-2.9	4.1	-2.0
AEROSPACE	19	5	7	5	1	3	6	-26.5	100.0	-15.2
AGRICULTURAL	9	17	11	14	5	6	4	-6.5	-33.3	-10.9
BIOMEDICAL	12	17	26	2	4	5	5	-13.6	.0	-11.8
CHEMICAL	91	70	51	64	63	64	75	-5.7	17.2	-2.7
CIVIL	43	27	54	45	34	28	42	-6.9	50.0	-.3
ELECTRICAL	42	45	31	42	42	41	58	-.4	41.5	4.7
ENGINEERING SCIENCE	8	12	17	9	18	28	11	23.2	-60.7	4.7
INDUSTRIAL	17	6	12	3	4	3	6	-25.1	100.0	-13.8
MECHANICAL	31	61	41	31	51	46	36	6.8	-21.7	2.2
METALLURGICAL/MATERIALS	51	54	38	60	43	44	45	-2.4	2.3	-1.8
MINING	2	1	1	0	0	1	9	-10.9	800.0	24.0
NUCLEAR	14	15	11	14	8	9	3	-7.1	-66.7	-19.8
PETROLEUM	1	0	1	0	4	0	1	-100.0	**	.0
ENGINEERING, N.E.C.	14	13	12	9	13	18	7	4.3	-61.1	-9.4
PHYSICAL SCIENCES	818	767	779	703	665	657	682	-3.6	3.8	-2.6
ASTRONOMY	29	34	41	29	18	13	13	-12.5	.0	-10.8
CHEMISTRY	633	575	547	457	455	399	499	-7.4	25.1	-3.3
PHYSICS	150	157	190	215	188	230	170	7.4	-26.1	1.8
PHYSICAL SCIENCES, N.E.C.	6	1	1	2	4	15	0	16.5	-100.0	-100.0
ENVIRONMENTAL SCIENCES	71	92	69	62	55	50	80	-5.7	60.0	1.7
ATMOSPHERIC SCIENCES	3	2	3	2	1	1	4	-16.7	300.0	4.2
GEOSCIENCES	45	63	38	44	38	32	53	-5.5	65.6	2.4
OCEANOGRAPHY	16	18	17	13	13	17	20	1.0	17.6	3.2
ENVIRONMENTAL SCIENCES, N.E.C.	7	9	11	3	3	0	3	-100.0	**	-11.4
MATHEMATICAL/COMPUTER SCIENCES	97	101	54	98	115	63	169	-6.9	168.3	8.3
COMPUTER SCIENCE	14	25	10	15	11	20	25	6.1	25.0	8.6
MATHEMATICS AND APPLIED MATHEMATICS	68	59	33	71	88	39	137	-8.8	251.3	10.5
STATISTICS	15	17	11	12	16	4	7	-19.8	75.0	-10.3
LIFE SCIENCES	3,281	3,767	4,582	3,126	3,287	3,737	4,176	2.2	11.7	3.5
AGRICULTURAL SCIENCES	140	141	123	87	87	90	115	-7.1	27.8	-2.8
BIOLOGICAL SCIENCES	1,399	1,401	1,614	1,389	1,537	1,755	1,941	3.9	10.6	4.8
ANATOMY	49	41	61	55	59	62	81	4.0	30.6	7.4
BIOCHEMISTRY	249	275	262	306	318	373	365	7.0	-2.1	5.6
BIOLOGY	246	175	234	214	199	144	231	-8.5	60.4	-.9
BIOMETRY/EPIDEMIOLOGY	5	8	23	14	14	4	12	-3.7	200.0	13.3
BIOPHYSICS	29	25	21	18	26	33	14	2.2	-57.6	-9.9
BOTANY	94	85	80	59	61	58	85	-7.7	46.6	-1.4
CELL BIOLOGY	39	44	65	81	91	108	114	18.5	5.6	16.6
ECOLOGY	4	1	4	1	3	11	6	18.4	-45.5	6.0
ENTOMOLOGY/PARASITOLOGY	64	38	37	26	31	31	31	-11.4	.0	-9.8
GENETICS	45	47	46	26	64	97	80	13.7	-17.5	8.6
MICROBIOLOGY	186	207	256	175	187	233	256	3.8	9.9	4.7
NUTRITION	59	68	54	40	43	52	52	-2.1	.0	-1.8
PATHOLOGY	87	90	119	77	122	159	191	10.6	20.1	11.9
PHARMACOLOGY	78	108	138	113	111	173	208	14.2	20.2	15.0
PHYSIOLOGY	106	102	134	123	142	155	149	6.5	-3.9	5.0
ZOOLOGY	37	61	59	49	59	47	49	4.1	4.3	4.1
BIOSCIENCES, N.E.C.	22	26	21	12	7	15	17	-6.2	13.3	-3.6
HEALTH SCIENCES	1,742	2,225	2,845	1,650	1,663	1,892	2,120	1.4	12.1	2.8
ANESTHESIOLOGY	58	21	42	33	25	45	38	-4.1	-15.6	-5.9
CANCER/ONCOLOGY	16	25	54	13	24	29	15	10.4	-48.3	-.9
CARDIOLOGY	195	244	266	131	140	162	177	-3.0	9.3	-1.4
DENTISTRY	18	36	274	76	42	93	197	31.5	111.8	40.8
ENDOCRINOLOGY	45	81	89	34	41	33	41	-5.0	24.2	-1.3
GASTROENTEROLOGY	83	82	103	62	68	28	41	-16.6	46.4	-9.6
HEMATOLOGY	57	96	87	40	45	40	23	-5.7	-42.5	-12.2
NEUROLOGY	46	70	109	90	79	120	103	17.3	-14.2	12.2
NURSING	0	0	0	1	0	0	0	**	**	**
OBSTETRICS/GYNECOLOGY	89	105	92	88	71	68	54	-4.4	-20.6	-6.9
OPHTHALMOLOGY	40	55	54	45	50	49	65	3.4	32.7	7.2
OTORHINOLARYNGOLOGY	11	24	13	14	22	18	6	8.6	-66.7	-8.3
PEDIATRICS	183	220	272	201	203	258	272	5.9	5.4	5.8
PHARMACEUTICAL SCIENCES	26	33	63	41	32	54	79	13.0	46.3	17.2
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	17	56	38	39	40	46	66	18.0	43.5	21.4
PSYCHIATRY	83	114	116	50	94	82	83	-.2	1.2	.0
PULMONARY DISEASE	76	104	130	61	66	46	68	-8.0	47.8	-1.6
RADIOLOGY	49	27	76	40	59	32	69	-6.9	115.6	5.0
SPEECH PATHOLOGY/AUDIOLOGY	4	2	14	4	2	1	0	-20.6	-100.0	-100.0
SURGERY	140	200	242	116	127	133	190	-.9	42.9	4.5
VETERINARY SCIENCES	15	32	37	9	16	13	27	-2.4	107.7	8.8
CLINICAL MEDICINE, N.E.C.	471	583	664	435	383	510	470	1.3	-7.8	*
HEALTH RELATED, N.E.C.	20	15	10	27	34	32	36	8.1	12.5	8.8
PSYCHOLOGY	169	143	159	172	172	99	130	-8.5	31.3	-3.7
SOCIAL SCIENCES	128	184	203	169	176	152	147	2.9	-3.3	2.0
AGRICULTURAL ECONOMICS	7	7	21	3	2	3	7	-13.2	133.3	.0
ANTHROPOLOGY	14	18	29	13	9	10	12	-5.5	20.0	-2.2
ECONOMICS (EXCEPT AGRICULTURAL)	29	43	53	63	62	11	5	-14.9	-54.5	-22.2
GEOGRAPHY	5	11	5	3	9	21	2	27.0	-90.5	-12.3
HISTORY AND PHILOSOPHY OF SCIENCE	5	11	16	9	10	14	9	18.7	-35.7	8.8
LINGUISTICS	13	24	22	24	35	40	38	20.6	-5.0	16.6
POLITICAL SCIENCE	15	17	13	14	21	6	29	-14.2	383.3	9.9
SOCIOLOGY	36	48	27	21	17	17	22	-11.8	29.4	-6.8
SOCIOLOGY/ANTHROPOLOGY	1	0	1	0	0	0	1	-100.0	**	.0
SOCIAL SCIENCES, N.E.C.	3	5	16	19	11	30	22	46.8	-26.7	32.9

1/ DATA ON POSTDOCTORATES WERE NOT COLLECTED IN 1978.
* LESS THAN 0.05 PERCENT CHANGE
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 62. — FULL-TIME SCIENCE/ENGINEERING GRADUATE STUDENTS WITH RESEARCH ASSISTANTSHIPS IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1975-77 AND 1979-82 1/

FIELD	NUMBER							AVERAGE ANNUAL PERCENT CHANGE		
	1975	1976	1977	1979	1980	1981	1982	1975-81	1981-82	1975-82
TOTAL, ALL FIELDS	40,136	42,717	43,896	48,410	50,815	51,954	52,094	4.4	0.3	3.8
ENGINEERING	10,987	11,352	11,899	12,868	13,971	14,444	14,626	4.7	1.3	4.2
AEROSPACE	512	484	497	503	580	583	617	2.2	5.8	2.7
AGRICULTURAL	296	276	309	347	362	398	427	5.1	7.3	5.4
BIOMEDICAL	203	191	200	206	215	253	304	3.7	20.2	5.9
CHEMICAL	1,301	1,381	1,395	1,626	1,845	2,018	2,097	7.6	3.9	7.1
CIVIL	1,718	1,864	2,015	2,021	2,207	2,228	2,107	4.4	-5.4	3.0
ELECTRICAL	2,183	2,153	2,435	2,589	2,830	2,860	2,933	4.6	2.6	4.3
ENGINEERING SCIENCE	468	444	400	443	451	508	520	1.4	2.4	1.5
INDUSTRIAL	516	478	457	541	585	540	540	.8	.0	.7
MECHANICAL	1,636	1,778	1,762	1,963	2,045	2,134	2,196	4.5	2.9	4.3
METALLURGICAL/MATERIALS	1,070	1,105	1,150	1,319	1,390	1,553	1,512	6.4	-2.6	5.1
MINING	111	128	119	78	120	161	137	6.4	-14.9	3.1
NUCLEAR	473	471	507	536	508	480	412	.2	-14.2	-2.0
PETROLEUM	63	74	92	118	104	118	100	11.0	-15.3	6.8
ENGINEERING, N.E.C.	437	525	561	573	729	610	724	5.7	18.7	7.5
PHYSICAL SCIENCES	6,441	6,784	6,806	7,710	8,260	8,525	8,695	4.8	2.0	4.4
ASTRONOMY	278	279	264	272	270	263	250	-.9	-4.9	-1.5
CHEMISTRY	3,233	3,521	3,597	4,085	4,541	4,732	4,841	6.6	2.3	5.9
PHYSICS	2,899	2,964	2,926	3,337	3,445	3,515	3,578	3.3	1.8	3.1
PHYSICAL SCIENCES, N.E.C.	31	20	19	16	4	15	26	-11.4	73.3	-2.5
ENVIRONMENTAL SCIENCES	2,838	3,177	3,219	3,505	3,625	3,360	3,258	2.9	-3.0	2.0
ATMOSPHERIC SCIENCES	419	437	450	483	498	460	462	1.6	.4	1.4
GEOSCIENCES	1,368	1,633	1,625	1,886	1,997	1,788	1,760	4.6	-1.6	3.7
OCEANOGRAPHY	801	821	823	814	800	791	780	-.2	-1.4	-.4
ENVIRONMENTAL SCIENCES, N.E.C.	250	286	321	322	330	321	256	4.3	-20.2	.3
MATHEMATICAL/COMPUTER SCIENCES	1,375	1,528	1,504	1,615	1,790	1,797	2,017	4.6	12.2	5.6
COMPUTER SCIENCE	746	782	781	861	1,065	1,087	1,251	6.5	15.1	7.7
MATHEMATICS AND APPLIED MATHEMATICS	366	458	417	463	441	438	473	3.0	8.0	3.7
STATISTICS	263	288	306	291	284	272	293	.6	7.7	1.6
LIFE SCIENCES	11,322	12,603	13,081	15,027	15,513	15,930	15,978	5.9	.3	5.0
AGRICULTURAL SCIENCES	3,710	3,964	4,074	4,428	4,523	4,660	4,613	3.9	-1.0	3.2
BIOLOGICAL SCIENCES	6,787	7,687	7,992	9,208	9,517	9,775	9,819	6.3	.5	5.4
ANATOMY	64	95	104	163	142	138	142	13.7	2.9	12.1
BIOCHEMISTRY	1,038	1,205	1,239	1,480	1,451	1,546	1,633	6.9	5.6	6.7
BIOLOGY	851	1,054	953	1,153	1,304	1,317	1,262	7.5	-4.2	5.8
BIOMETRY/EPIDEMIOLOGY	62	83	89	88	117	100	99	8.3	-1.0	6.9
BIOPHYSICS	163	167	189	174	161	124	133	-4.5	7.3	-2.9
BOTANY	999	1,092	1,164	1,249	1,265	1,240	1,309	3.7	5.6	3.9
CELL BIOLOGY	82	100	138	179	180	232	265	18.9	14.2	18.2
ECOLOGY	157	212	249	247	272	221	233	5.9	5.4	5.8
ENTOMOLOGY/PARASITOLOGY	656	662	674	819	890	806	764	3.5	-5.2	2.2
GENETICS	138	159	165	191	235	252	260	10.6	3.2	9.5
MICROBIOLOGY	664	750	755	890	941	1,049	1,088	7.9	3.7	7.3
NUTRITION	775	889	980	1,066	1,135	1,113	1,066	6.2	-4.2	4.7
PATHOLOGY	84	107	106	171	166	177	206	13.2	16.4	13.7
PHARMACOLOGY	268	277	320	389	349	438	410	8.5	-6.4	6.3
PHYSIOLOGY	292	341	404	393	417	461	432	7.9	-6.3	5.8
ZOOLOGY	474	474	443	479	380	438	379	-1.3	-13.5	-3.1
BIOSCIENCES, N.E.C.	20	20	20	77	112	123	138	35.4	12.2	31.8
HEALTH SCIENCES	825	952	1,015	1,391	1,473	1,495	1,546	10.4	3.4	9.4
ANESTHESIOLOGY	0	1	0	0	0	0	0	**	**	**
CANCER/ONCOLOGY	20	10	9	10	9	0	12	-100.0	**	-7.0
CARDIOLOGY	1	0	0	2	6	3	0	20.1	-100.0	-100.0
DENTISTRY	9	22	12	26	28	11	12	3.4	9.1	4.2
ENDOCRINOLOGY	6	2	3	7	10	12	10	12.2	-16.7	7.6
GASTROENTEROLOGY	0	0	0	0	0	1	0	**	-100.0	**
HEMATOLOGY	0	1	4	0	1	1	0	**	-100.0	**
NEUROLOGY	53	44	51	71	72	50	85	-1.0	70.0	7.0
NURSING	13	10	28	75	101	107	128	42.1	19.6	38.6
OBSTETRICS/GYNECOLOGY	11	14	7	8	0	0	8	-100.0	**	-4.4
OPHTHALMOLOGY	0	0	1	0	3	7	11	**	57.1	**
OTORHINOLARYNGOLOGY	2	7	6	4	0	3	4	7.0	33.3	10.4
PEDIATRICS	7	7	3	0	0	0	6	-100.0	**	-2.2
PHARMACEUTICAL SCIENCES	185	223	256	392	400	408	376	14.1	-7.8	10.7
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	110	113	99	162	185	232	202	13.2	-12.9	9.1
PSYCHIATRY	6	2	0	20	8	14	5	15.2	-64.3	-2.6
PULMONARY DISEASE	0	0	0	0	0	0	1	**	**	**
RADIOLOGY	67	76	36	31	45	26	35	-14.6	34.6	-8.9
SPEECH PATHOLOGY/AUDIOLOGY	164	206	235	235	271	249	308	7.2	22.7	9.4
SURGERY	4	10	9	0	4	8	4	12.2	-50.0	.0
VETERINARY SCIENCES	114	134	183	172	157	167	161	6.6	-3.6	5.1
CLINICAL MEDICINE, N.E.C.	9	19	22	37	31	35	53	25.4	51.4	28.8
HEALTH RELATED, N.E.C.	44	51	51	139	142	161	125	24.1	-22.4	16.1
PSYCHOLOGY	2,213	2,248	2,300	2,335	2,336	2,661	2,521	3.1	-5.3	1.9
SOCIAL SCIENCES	4,960	5,025	5,087	5,350	5,320	5,237	4,999	.9	-4.5	.1
AGRICULTURAL ECONOMICS	889	868	952	979	962	936	848	.9	-9.4	-.7
ANTHROPOLOGY	378	339	392	375	349	303	314	-3.6	3.6	-2.6
ECONOMICS (EXCEPT AGRICULTURAL)	1,181	1,202	1,174	1,180	1,185	1,153	1,052	-.4	-8.8	-1.6
GEOGRAPHY	218	256	233	216	256	232	214	1.0	-7.8	-.3
HISTORY AND PHILOSOPHY OF SCIENCE	2	10	12	11	14	16	11	41.4	-31.3	27.6
LINGUISTICS	103	142	104	135	139	180	130	9.8	-27.8	3.4
POLITICAL SCIENCE	760	754	686	860	804	823	852	1.3	3.5	1.6
SOCIOLOGY	734	844	806	750	743	747	636	.3	-14.9	-2.0
SOCIOLOGY/ANTHROPOLOGY	143	98	94	96	81	115	129	-3.6	12.2	-1.5
SOCIAL SCIENCES, N.E.C.	552	512	634	748	787	732	813	4.8	11.1	5.7

1/ DISTRIBUTION BY TYPE OF MAJOR SUPPORT WAS NOT REQUESTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 63. — FULL-TIME SCIENCE/ENGINEERING GRADUATE STUDENTS WITH FEDERALLY-FUNDED RESEARCH ASSISTANTSHIPS IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1975-77 AND 1979-82 1/

FIELD	NUMBER							AVERAGE ANNUAL PERCENT CHANGE		
	1975	1976	1977	1979	1980	1981	1982	1975-81	1981-82	1975-82
TOTAL, ALL FIELDS	23,077	24,420	25,179	27,841	29,080	28,944	28,178	3.8	-2.6	2.9
ENGINEERING	6,935	7,228	7,563	8,018	8,520	8,524	8,569	3.5	.5	3.1
AEROSPACE	385	330	366	355	375	399	469	.6	17.5	2.9
AGRICULTURAL	93	80	127	114	110	131	138	5.9	5.3	5.8
BIOMEDICAL	117	122	104	129	110	123	168	.8	36.6	5.3
CHEMICAL	805	845	860	910	1,056	1,091	1,084	5.2	-.6	4.3
CIVIL	902	1,022	1,078	1,117	1,244	1,088	1,066	3.2	-2.0	2.4
ELECTRICAL	1,697	1,665	1,828	1,875	1,964	1,957	2,051	2.4	4.8	2.7
ENGINEERING SCIENCE	369	331	240	355	369	391	356	1.0	-9.0	-.5
INDUSTRIAL	220	172	212	230	257	234	188	1.0	-19.7	-2.2
MECHANICAL	1,045	1,185	1,189	1,273	1,240	1,283	1,275	3.5	-.6	2.9
METALLURGICAL/MATERIALS	760	823	836	1,013	1,017	1,128	1,058	6.8	-6.2	4.8
MINING	70	93	80	58	87	109	73	7.7	-33.0	.6
NUCLEAR	191	216	248	260	233	238	223	3.7	-6.3	2.2
PETROLEUM	12	18	39	40	44	45	37	24.6	-17.8	17.5
ENGINEERING, N.E.C.	269	326	356	289	414	307	383	2.2	24.8	5.2
PHYSICAL SCIENCES	5,487	5,684	5,768	6,459	6,949	7,253	7,067	4.8	-2.6	3.7
ASTRONOMY	235	247	223	225	236	229	202	-.4	-11.8	-2.1
CHEMISTRY	2,664	2,827	2,883	3,285	3,733	3,864	3,905	6.4	1.1	5.6
PHYSICS	2,580	2,604	2,648	2,940	2,976	3,158	2,956	3.4	-6.4	2.0
PHYSICAL SCIENCES, N.E.C. ...	8	6	14	9	4	2	4	-20.6	100.0	-9.4
ENVIRONMENTAL SCIENCES	2,089	2,274	2,307	2,665	2,663	2,358	2,286	2.0	-3.1	1.3
ATMOSPHERIC SCIENCES	334	394	420	457	454	411	412	3.5	.2	3.0
GEOSCIENCES	1,017	1,130	1,157	1,408	1,439	1,181	1,171	2.5	-.8	2.0
OCEANOGRAPHY	587	572	562	610	582	553	543	-1.0	-1.8	-1.1
ENVIRONMENTAL SCIENCES, N.E.C.	151	178	168	190	188	213	160	5.9	-24.9	.8
MATHEMATICAL/COMPUTER SCIENCES .	752	795	877	1,002	1,095	1,052	1,142	5.8	8.6	6.2
COMPUTER SCIENCE	452	425	511	623	717	726	805	8.2	10.9	8.6
MATHEMATICS AND APPLIED MATHEMATICS	203	249	225	268	259	244	234	3.1	-4.1	2.1
STATISTICS	97	121	141	111	119	82	103	-2.8	25.6	.9
LIFE SCIENCES	5,373	6,048	6,172	7,076	7,489	7,456	7,236	5.6	-3.0	4.3
AGRICULTURAL SCIENCES	1,334	1,349	1,410	1,460	1,546	1,477	1,434	1.7	-2.9	1.0
BIOLOGICAL SCIENCES	3,558	4,194	4,229	4,969	5,311	5,325	5,181	7.0	-2.7	5.5
ANATOMY	30	56	62	77	80	78	83	17.3	6.4	15.6
BIOCHEMISTRY	663	844	865	1,033	1,030	1,125	1,170	9.2	4.0	8.5
BIOLOGY	530	711	608	787	918	871	807	8.6	-7.3	6.2
BIOMETRY/EPIDEMIOLOGY	46	53	60	53	81	63	50	5.4	-20.6	1.2
BIOPHYSICS	124	128	143	126	106	95	85	-4.3	-10.5	-5.3
BOTANY	359	406	451	504	535	449	507	3.8	12.9	5.1
CELL BIOLOGY	66	53	94	137	142	177	201	17.9	13.6	17.2
ECOLOGY	87	109	125	141	148	112	111	4.3	-.9	3.5
ENTOMOLOGY/PARASITOLOGY	238	246	239	215	287	258	218	1.4	-15.5	-1.2
GENETICS	87	86	80	92	127	121	121	5.7	.0	4.8
MICROBIOLOGY	424	492	462	620	672	695	665	8.6	-4.3	6.6
NUTRITION	297	349	339	395	425	411	378	5.6	-8.0	3.5
PATHOLOGY	46	48	53	84	91	103	106	14.4	2.9	12.7
PHARMACOLOGY	148	146	178	197	171	215	188	6.4	-12.6	3.5
PHYSIOLOGY	149	166	217	191	225	273	226	10.6	-17.2	6.1
ZOOLOGY	261	296	245	287	240	220	199	-2.8	-9.5	-3.8
BIOSCIENCES, N.E.C.	3	5	8	30	33	59	66	64.3	11.9	55.5
HEALTH SCIENCES	481	505	533	647	632	654	621	5.3	-5.0	3.7
ANESTHESIOLOGY	0	1	0	0	0	0	0	**	**	**
CANCER/ONCOLOGY	20	10	9	10	9	0	12	-100.0	**	-7.0
CARDIOLOGY	1	0	0	2	3	0	0	-100.0	**	-100.0
DENTISTRY	2	4	5	9	5	8	0	26.0	-100.0	-100.0
ENDOCRINOLOGY	3	2	3	6	10	12	10	26.0	-16.7	18.8
GASTROENTEROLOGY	0	0	0	0	0	0	0	0	0	0
HEMATOLOGY	0	0	0	0	0	0	0	0	0	0
NEUROLOGY	44	37	39	59	53	40	64	-1.6	60.0	5.5
NURSING	1	1	11	36	34	48	32	90.6	-33.3	64.1
OBSTETRICS/GYNECOLOGY	8	14	6	6	0	0	6	-100.0	**	-4.0
OPHTHALMOLOGY	0	0	0	0	0	7	11	**	57.1	**
OTORHINOLARYNGOLOGY	2	5	5	4	0	3	4	7.0	33.3	10.4
PEDIATRICS	6	7	2	0	0	0	0	-100.0	**	-100.0
PHARMACEUTICAL SCIENCES	113	155	157	181	193	219	199	11.7	-9.1	8.4
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	59	53	51	82	92	75	44	4.1	-41.3	-4.1
PSYCHIATRY	6	1	0	20	7	11	5	10.6	-54.5	-2.6
PULMONARY DISEASE	0	0	0	0	0	0	0	0	0	0
RADIOLOGY	52	47	24	18	25	16	19	-17.8	18.8	-13.4
SPEECH PATHOLOGY/AUDIOLOGY ..	87	90	118	111	114	114	112	4.6	-1.8	3.7
SURGERY	1	8	9	0	2	7	2	38.3	-71.4	10.4
VETERINARY SCIENCES	42	29	53	54	44	49	38	2.6	-22.4	-1.4
CLINICAL MEDICINE, N.E.C. ...	4	11	13	14	11	8	30	12.2	275.0	33.4
HEALTH RELATED, N.E.C.	30	30	28	35	30	37	33	3.6	-10.8	1.4
PSYCHOLOGY	1,006	974	1,035	1,152	914	1,023	903	.3	-11.7	-1.5
SOCIAL SCIENCES	1,435	1,417	1,457	1,469	1,450	1,278	975	-1.9	-23.7	-5.4
AGRICULTURAL ECONOMICS	310	294	373	338	364	359	305	2.5	-15.0	-.2
ANTHROPOLOGY	156	118	114	128	105	123	90	-3.9	-26.8	-7.6
ECONOMICS (EXCEPT AGRICULTURAL)	301	241	272	290	286	177	122	-8.5	-31.1	-12.1
GEOGRAPHY	58	79	66	64	78	71	66	3.4	-7.0	1.9
HISTORY AND PHILOSOPHY OF SCIENCE	0	3	5	2	1	0	0	**	**	**
LINGUISTICS	40	80	45	44	45	50	33	3.8	-34.0	-2.7
POLITICAL SCIENCE	78	90	89	100	84	42	54	-9.8	28.6	-5.1
SOCIOLOGY	288	292	290	304	315	316	197	1.6	-37.7	-5.3
SOCIOLOGY/ANTHROPOLOGY	20	19	22	18	17	10	10	-10.9	.0	-9.4
SOCIAL SCIENCES, N.E.C.	184	201	181	181	155	130	98	-5.6	-24.6	-8.6

1/ DISTRIBUTION BY TYPE OF MAJOR SUPPORT WAS NOT REQUESTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 64. — FULL-TIME SCIENCE/ENGINEERING GRADUATE STUDENTS WITH NONFEDERALLY-FUNDED RESEARCH ASSISTANTSHIPS IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD: 1975-77 AND 1979-82 1/

FIELD	NUMBER							AVERAGE ANNUAL PERCENT CHANGE		
	1975	1976	1977	1979	1980	1981	1982	1975-81	1981-82	1975-82
TOTAL, ALL FIELDS	17,059	18,297	18,717	20,569	21,735	23,010	23,916	5.1	3.9	4.9
ENGINEERING	4,052	4,124	4,336	4,850	5,451	5,920	6,057	6.5	2.3	5.9
AEROSPACE	127	154	131	148	205	184	148	6.4	-19.6	2.2
AGRICULTURAL	203	196	182	233	252	267	289	4.7	8.2	5.2
BIOMEDICAL	86	69	96	77	105	130	136	7.1	4.6	6.8
CHEMICAL	496	536	535	716	789	927	1,013	11.0	9.3	10.7
CIVIL	816	842	937	904	963	1,140	1,041	5.7	-8.7	3.5
ELECTRICAL	486	488	607	714	866	903	882	10.9	-2.3	8.9
ENGINEERING SCIENCE	99	113	160	88	82	117	164	2.8	40.2	7.5
INDUSTRIAL	296	306	245	311	328	306	352	.6	15.0	2.5
MECHANICAL	591	593	573	690	805	851	921	6.3	8.2	6.5
METALLURGICAL/MATERIALS	310	282	314	306	373	425	454	5.4	6.8	5.6
MINING	41	35	39	20	33	52	64	4.0	23.1	6.6
NUCLEAR	282	255	259	276	275	242	189	-2.5	-21.9	-5.6
PETROLEUM	51	56	53	78	60	73	63	6.2	-13.7	3.1
ENGINEERING, N.E.C.	168	199	205	289	315	303	341	10.3	12.5	10.6
PHYSICAL SCIENCES	954	1,100	1,038	1,251	1,311	1,272	1,628	4.9	28.0	7.9
ASTRONOMY	43	32	41	47	34	34	48	-3.8	41.2	1.6
CHEMISTRY	569	694	714	800	808	868	936	7.3	7.8	7.4
PHYSICS	319	360	278	397	469	357	622	1.9	74.2	10.0
PHYSICAL SCIENCES, N.E.C.	23	14	5	7	0	13	22	-9.1	69.2	-.6
ENVIRONMENTAL SCIENCES	749	903	912	840	962	1,002	972	5.0	-3.0	3.8
ATMOSPHERIC SCIENCES	85	43	30	26	44	49	50	-8.8	2.0	-7.3
GEOSCIENCES	351	503	468	478	558	607	589	9.6	-3.0	7.7
OCEANOGRAPHY	214	249	261	204	218	238	237	1.8	-.4	1.5
ENVIRONMENTAL SCIENCES, N.E.C.	99	108	153	132	142	108	96	1.5	-11.1	-.4
MATHEMATICAL/COMPUTER SCIENCES	623	733	627	613	695	745	875	3.0	17.4	5.0
COMPUTER SCIENCE	294	357	270	238	348	361	446	3.5	23.5	6.1
MATHEMATICS AND APPLIED MATHEMATICS	163	209	192	195	182	194	239	2.9	23.2	5.6
STATISTICS	166	167	165	180	165	190	190	2.3	.0	1.9
LIFE SCIENCES	5,949	6,555	6,909	7,951	8,024	8,474	8,742	6.1	3.2	5.7
AGRICULTURAL SCIENCES	2,376	2,615	2,664	2,968	2,977	3,183	3,179	5.0	-.1	4.2
BIOLOGICAL SCIENCES	3,229	3,493	3,763	4,239	4,206	4,450	4,638	5.5	4.2	5.3
ANATOMY	34	39	42	86	62	60	59	9.9	-1.7	8.2
BIOCHEMISTRY	375	361	374	447	421	421	463	1.9	10.0	3.1
BIOLOGY	321	343	345	366	386	446	455	5.6	2.0	5.1
BIOMETRY/EPIDEMIOLOGY	16	30	29	35	36	37	49	15.0	32.4	17.3
BIOPHYSICS	39	39	46	48	55	29	48	-4.8	65.5	3.0
BOTANY	640	686	713	745	730	791	802	3.6	1.4	3.3
CELL BIOLOGY	16	47	44	42	38	55	64	22.8	16.4	21.9
ECOLOGY	70	103	124	106	124	109	122	7.7	11.9	8.3
ENTOMOLOGY/PARASITOLOGY	418	416	435	604	603	548	546	4.6	-.4	3.9
GENETICS	51	73	85	99	108	131	139	17.0	6.1	15.4
MICROBIOLOGY	240	258	293	270	269	354	423	6.7	19.5	8.4
NUTRITION	478	540	641	671	710	702	688	6.6	-2.0	5.3
PATHOLOGY	38	59	53	87	75	74	100	11.7	35.1	14.8
PHARMACOLOGY	120	131	142	192	178	223	222	10.9	-.4	9.2
PHYSIOLOGY	143	175	187	202	192	188	206	4.7	9.6	5.4
ZOOLOGY	213	178	198	192	140	218	180	.4	-17.4	-2.4
BIOSCIENCES, N.E.C.	17	15	12	47	79	64	72	24.7	12.5	22.9
HEALTH SCIENCES	344	447	482	744	841	841	925	16.1	10.0	15.2
ANESTHESIOLOGY	0	0	0	0	0	0	0	0	0	0
CANCER/ONCOLOGY	0	0	0	0	0	0	0	0	0	0
CARDIOLOGY	0	0	0	0	3	3	0	**	-100.0	**
DENTISTRY	7	18	7	17	23	3	12	-13.2	300.0	8.0
ENDOCRINOLOGY	3	0	0	1	0	0	0	-100.0	**	-100.0
GASTROENTEROLOGY	0	0	0	0	0	1	0	**	-100.0	**
HEMATOLOGY	0	1	4	0	1	1	0	**	-100.0	**
NEUROLOGY	9	7	12	12	19	10	21	1.8	110.0	12.9
NURSING	12	9	17	39	67	59	96	30.4	62.7	34.6
OBSTETRICS/GYNECOLOGY	3	0	1	2	0	0	2	-100.0	**	-5.6
OPHTHALMOLOGY	0	0	1	0	3	0	0	**	**	**
OTORHINOLARYNGOLOGY	0	2	1	0	0	0	0	**	**	**
PEDIATRICS	1	0	1	0	0	0	6	-100.0	**	29.2
PHARMACEUTICAL SCIENCES	72	68	99	211	207	189	177	17.5	-6.3	13.7
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	51	60	48	80	93	157	158	20.6	.6	17.5
PSYCHIATRY	0	1	0	0	1	3	0	**	-100.0	**
PULMONARY DISEASE	0	0	0	0	0	0	1	**	**	**
RADIOLOGY	15	29	12	13	20	10	16	-6.5	60.0	.9
SPEECH PATHOLOGY/AUDIOLOGY	77	116	117	124	157	135	196	9.8	45.2	14.3
SURGERY	3	2	0	0	2	1	2	-16.7	100.0	-5.6
VETERINARY SCIENCES	72	105	130	118	113	118	123	8.6	4.2	8.0
CLINICAL MEDICINE, N.E.C.	5	8	9	23	20	27	23	32.5	-14.8	24.4
HEALTH RELATED, N.E.C.	14	21	23	104	112	124	92	43.8	-25.8	30.9
PSYCHOLOGY	1,207	1,274	1,265	1,183	1,422	1,638	1,618	5.2	-1.2	4.3
SOCIAL SCIENCES	3,525	3,608	3,630	3,881	3,870	3,959	4,024	2.0	1.6	1.9
AGRICULTURAL ECONOMICS	579	574	579	641	598	577	543	-.1	-5.9	-.9
ANTHROPOLOGY	222	221	278	247	244	180	224	-3.4	24.4	.1
ECONOMICS (EXCEPT AGRICULTURAL)	880	961	902	890	899	976	930	1.7	-4.7	.8
GEOGRAPHY	160	177	167	152	178	161	148	.1	-8.1	-1.1
HISTORY AND PHILOSOPHY OF SCIENCE	2	7	7	9	13	16	11	41.4	-31.3	27.6
LINGUISTICS	63	62	59	91	94	130	97	12.8	-25.4	6.4
POLITICAL SCIENCE	682	664	597	760	720	781	798	2.3	2.2	2.3
SOCIOLOGY	446	552	516	446	428	431	439	-.6	1.9	-.2
SOCIOLOGY/ANTHROPOLOGY	123	79	72	78	64	105	119	-2.6	13.3	-.5
SOCIAL SCIENCES, N.E.C.	368	311	453	567	632	602	715	8.5	18.8	10.0

1/ DISTRIBUTION BY TYPE OF MAJOR SUPPORT WAS NOT REQUESTED IN 1978.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 65. FULL-TIME-EQUIVALENT R&D SCIENTISTS AND ENGINEERS EMPLOYED AT UNIVERSITIES AND COLLEGES: SELECTED YEARS

YEAR	NUMBER OF R&D FTE'S	PERCENT CHANGE FROM PRECEDING YEAR
1969	50,400	-
1972	48,900	-1.0 (1)
1973	46,900	-4.1
1974	47,972	2.3
1975	50,926	6.2
1976	52,744	3.6
1977	54,243	2.8
1978	55,962	3.2
1982	59,473	1.5 (2)
1983	60,265	1.3

1/ AVERAGE ANNUAL PERCENT CHANGE, 1969-72
2/ AVERAGE ANNUAL PERCENT CHANGE, 1978-82
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 66. FULL-TIME-EQUIVALENT R&D SCIENTISTS AND ENGINEERS EMPLOYED AT UNIVERSITIES AND COLLEGES BY FIELD OF EMPLOYMENT: 1969 AND 1983

FIELD OF EMPLOYMENT	1969	1983
TOTAL	50,400	60,265
ENGINEERS	5,654	7,055
PHYSICAL SCIENTISTS	7,830	7,058
ENVIRONMENTAL SCIENTISTS 1/	-	3,034
MATHEMATICAL AND COMPUTER SCIENTISTS	1,899	2,196
LIFE SCIENTISTS	29,274	35,847
PSYCHOLOGISTS	1,427	1,464
SOCIAL SCIENTISTS	4,316	3,614

1/ INCLUDED WITH PHYSICAL SCIENTISTS IN 1969.
NOTE: DETAIL MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 67. FULL-TIME-EQUIVALENT SCIENTISTS AND ENGINEERS EMPLOYED AT UNIVERSITIES AND COLLEGES BY FIELD OF EMPLOYMENT AND TYPE OF ACTIVITY: JANUARY 1978 AND JANUARY 1982-83

FIELD	TOTAL FTE'S			R&D FTE'S		
	1978	1982	1983	1978	1982	1983
TOTAL	271,656	299,705	305,447	55,962	59,473	60.265
ENGINEERS	27,546	31,005	32,048	5,910	6,724	7,055
AERONAUTICAL AND ASTRONAUTICAL ENGINEERS	1,024	1,161	1,159	290	314	325
CHEMICAL ENGINEERS	1,869	2,031	2,116	462	458	532
CIVIL ENGINEERS	4,741	5,253	5,534	717	782	770
ELECTRICAL ENGINEERS	6,272	7,588	8,043	1,327	1,721	1,905
MECHANICAL ENGINEERS	5,019	5,584	5,690	833	862	893
OTHER ENGINEERS	8,621	9,385	9,510	2,281	2,589	2,633
PHYSICAL SCIENTISTS	30,580	31,155	31,070	7,016	7,303	7,058
ASTRONOMERS 1/	-	1,048	932	-	408	381
CHEMISTS	16,378	16,171	16,298	3,291	3,111	3,060
PHYSICISTS	12,056	12,221	12,271	2,795	3,081	3,044
OTHER PHYSICAL SCIENTISTS	2,146	1,716	1,566	930	705	572
ENVIRONMENTAL SCIENTISTS	9,004	9,299	9,338	2,584	2,995	3,034
ATMOSPHERIC SCIENTISTS	899	815	970	453	400	545
EARTH SCIENTISTS	6,523	6,059	6,002	1,391	1,406	1,299
OCEANOGRAPHERS	1,582	1,569	1,590	741	930	955
OTHER ENVIRONMENTAL SCIENTISTS 1/	-	856	775	-	261	236
MATHEMATICAL AND COMPUTER SCIENTISTS	28,191	34,061	36,207	2,463	2,149	2,196
MATHEMATICIANS	22,461	24,529	25,314	1,614	1,354	1,302
COMPUTER SCIENTISTS	5,731	9,532	10,894	847	795	893
LIFE SCIENTISTS	108,854	127,652	130,581	31,045	35.228	35,847
AGRICULTURAL SCIENTISTS	14,378	15,530	15,835	4,556	6,595	6,560
BIOLOGICAL SCIENTISTS	40,711	42,665	43,904	12,360	12,680	13,108
MEDICAL SCIENTISTS	53,765	60,824	60,646	14,130	15,329	15,483
OTHER LIFE SCIENTISTS 1/	-	8,630	10,198	-	623	699
PSYCHOLOGISTS	20,141	19,442	19,367	2,032	1,478	1,464
SOCIAL SCIENTISTS	47,340	47,097	46,832	4,912	3,593	3,614
ECONOMISTS	12,277	12,968	13,065	1,651	1,240	1,197
POLITICAL SCIENTISTS	10,135	10,223	10,155	754	623	663
SOCIOLOGISTS	13,175	12,277	11,894	1,117	702	640
OTHER SOCIAL SCIENTISTS	11,754	11,630	11,717	1,389	1,029	1,113

1/ DATA NOT AVAILABLE PRIOR TO 1979.
NOTE: DETAIL MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 68. FULL-TIME-EQUIVALENT SCIENTISTS AND ENGINEERS EMPLOYED AT DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF EMPLOYMENT AND TYPE OF ACTIVITY: JANUARY 1978 AND JANUARY 1982-83

FIELD	TOTAL FTE'S			R&D FTE'S		
	1978	1982	1983	1978	1982	1983
TOTAL	181,068	204,649	207,363	53,395	57,780	58,729
ENGINEERS	20,055	22,719	23,290	5,672	6,607	6,938
AERONAUTICAL AND ASTRONAUTICAL ENGINEERS	779	895	906	278	304	318
CHEMICAL ENGINEERS	1,653	1,804	1,858	459	451	524
CIVIL ENGINEERS	3,337	3,745	3,945	678	758	754
ELECTRICAL ENGINEERS	4,140	5,121	5,372	1,261	1,690	1,871
MECHANICAL ENGINEERS	3,338	3,716	3,735	788	836	864
OTHER ENGINEERS	6,808	7,436	7,476	2,208	2,568	2,608
PHYSICAL SCIENTISTS	17,424	18,181	17,901	6,644	6,956	6,743
ASTRONOMERS 1/	-	808	696	-	405	379
CHEMISTS	8,673	8,640	8,675	3,053	2,923	2,882
PHYSICISTS	7,345	7,659	7,668	2,669	2,969	2,951
OTHER PHYSICAL SCIENTISTS	1,406	1,074	862	922	660	529
ENVIRONMENTAL SCIENTISTS	6,212	6,597	6,625	2,443	2,891	2,925
ATMOSPHERIC SCIENTISTS	[illegible]	715	871	430	394	539
EARTH SCIENTISTS	4,032	3,944	3,854	1,296	1,345	1,238
OCEANOGRAPHERS	1,412	1,395	1,423	717	909	930
OTHER ENVIRONMENTAL SCIENTISTS 1/	-	543	476	-	244	218
MATHEMATICAL AND COMPUTER SCIENTISTS	12,192	15,219	16,012	2,194	1,921	2,008
MATHEMATICIANS	9,351	10,307	10,578	1,435	1,210	1,190
COMPUTER SCIENTISTS	2,842	4,912	5,434	759	711	817
LIFE SCIENTISTS	91,367	107,804	109,809	30,203	34,755	35,386
AGRICULTURAL SCIENTISTS	12,299	13,431	13,678	4,339	6,502	6,460
BIOLOGICAL SCIENTISTS	28,087	30,636	31,741	11,883	12,345	12,783
MEDICAL SCIENTISTS	50,981	58,515	58,298	13,983	15,306	15,466
OTHER LIFE SCIENTISTS 1/	-	5,221	6,091	-	602	677
PSYCHOLOGISTS	8,945	8,987	8,960	1,820	1,351	1,367
SOCIAL SCIENTISTS	24,873	25,144	24,766	4,419	3,299	3,365
ECONOMISTS	6,909	7,342	7,310	1,532	1,179	1,148
POLITICAL SCIENTISTS	4,848	5,113	5,012	653	563	607
SOCIOLOGISTS	5,988	5,697	5,398	975	606	563
OTHER SOCIAL SCIENTISTS	7,129	6,991	7,047	1,256	952	1,046

1/ DATA NOT AVAILABLE PRIOR TO 1979.
NOTE: DETAIL MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
SOURCE: NATIONAL SCIENCE FOUNDATION

Table 69. Scientists and engineers by field, sex, and labor force status: 1976, 1980, and 1981

Field and sex	Total			Labor force			Outside labor force		
	1976	1980	1981	1976	1980	1981	1976	1980	1981
All fields	2,523,600	3,149,500	3,381,100	2,369,000	2,941,200	3,167,400	154,600	208,300	213,700
Men	2,270,600	2,739,500	2,913,200	2,148,500	2,571,700	2,741,900	122,100	167,800	171,300
Women	253,000	410,000	467,900	220,500	369,500	425,500	32,500	40,400	42,500
All scientists	1,256,900	1,625,800	1,788,000	1,177,700	1,516,400	1,674,200	79,200	108,400	113,800
Men	1,016,800	1,250,600	1,356,600	968,800	1,180,300	1,283,900	48,000	74,400	72,700
Women	240,100	375,100	431,400	208,900	336,200	390,300	31,200	38,900	41,200
Physical scientists	223,600	264,800	271,800	200,700	226,900	233,200	22,900	37,900	38,600
Men	196,300	228,600	234,500	178,500	199,100	204,500	17,800	29,500	29,900
Women	27,300	36,200	37,400	22,200	27,800	28,700	5,100	8,300	8,700
Mathematical scientists	96,000	127,300	141,600	90,200	120,000	134,000	5,800	7,300	7,600
Men	79,700	101,500	110,300	76,200	96,500	105,300	3,500	4,900	5,000
Women	16,300	25,800	31,300	14,000	23,500	28,700	2,300	2,300	2,600
Computer specialists	209,500	357,400	430,400	204,100	349,900	422,500	5,400	7,500	7,900
Men	171,900	262,200	314,600	169,900	259,500	311,600	2,100	2,800	3,000
Women	37,600	95,200	115,800	34,200	90,400	110,900	3,400	4,800	4,900
Environmental scientists	70,800	103,700	116,100	66,300	95,400	106,500	4,600	8,300	9,600
Men	65,600	91,200	99,500	61,900	84,300	91,800	3,700	6,900	7,700
Women	5,300	12,500	16,500	4,300	11,000	14,700	900	1,500	1,900
Life scientists	298,300	407,200	439,800	282,900	383,600	415,100	15,400	23,600	24,600
Men	242,700	316,500	335,400	234,500	303,400	322,000	8,100	13,100	13,400
Women	55,600	90,700	104,400	48,300	80,200	93,100	7,300	10,500	11,300
Psychologists	118,200	134,000	141,700	112,300	126,000	133,200	5,900	8,000	8,500
Men	79,700	81,000	82,800	75,800	77,900	79,500	2,100	3,100	3,200
Women	40,300	53,100	59,000	36,600	48,100	53,700	3,800	4,900	5,300
Social scientists	240,500	231,300	264,600	221,300	214,700	229,600	19,100	16,700	17,000
Men	182,600	169,700	179,400	172,000	159,500	169,100	10,700	10,100	10,300
Women	57,800	61,700	67,100	49,400	55,100	60,500	8,500	6,600	6,700
All engineers	1,266,700	1,523,700	1,593,100	1,191,300	1,424,800	1,493,200	75,400	99,000	99,900
Men	1,253,800	1,488,900	1,556,600	1,179,700	1,391,400	1,458,000	24,100	97,400	98,600
Women	12,900	34,900	36,500	11,600	33,300	35,200	1,300	1,500	1,300
Astronautical/aeronautical	41,100	50,100	52,600	39,700	47,900	50,700	1,400	2,200	1,900
Men	40,200	48,300	51,700	39,100	46,400	49,800	1,100	2,000	1,900
Women	900	1,700	900	600	1,500	900	300	200	(1)
Chemical	63,500	78,000	84,400	60,700	74,200	80,300	2,800	3,700	4,100
Men	61,800	74,100	79,400	59,100	70,500	75,400	2,700	3,700	4,000
Women	1,700	3,800	5,000	1,600	3,700	4,900	100	100	100
Civil	160,600	203,600	213,700	154,100	192,400	202,500	6,500	11,200	11,300
Men	158,700	199,500	209,800	152,200	188,500	198,700	6,500	11,000	11,100
Women	1,900	4,200	4,000	1,900	4,000	3,800	(1)	200	200
Electrical/electronic	201,700	273,900	293,200	196,900	262,400	281,400	4,900	11,500	11,800
Men	200,500	269,800	289,400	196,100	258,500	277,600	4,400	11,300	11,800
Women	1,200	4,100	3,800	800	3,900	3,800	400	200	(1)
Mechanical	211,600	248,400	261,300	207,400	238,900	251,200	4,100	9,500	10,000
Men	210,300	244,400	258,200	206,200	235,100	248,200	4,100	9,400	10,000
Women	1,300	3,900	3,100	1,200	3,800	3,000	(1)	100	100
Other	588,200	669,800	687,800	532,500	608,900	627,100	55,700	60,900	60,700
Men	582,300	652,700	668,100	527,000	592,500	608,300	55,300	60,100	59,800
Women	5,900	17,200	19,700	5,500	16,400	18,800	400	800	900

[1] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 70. Scientists and engineers by field, sex, and employment status: 1976, 1980, and 1981

	Total Employed											
	Total			In science/engineering			Outside science/engineering			Unemployed, seeking		
Field and sex	1976	1980	1981	1976	1980	1981	1976	1980	1981	1976	1980	1981
All fields	2,324,500	2,910,500	3,134,100	2,103,500	2,593,600	2,795,600	221,000	316,900	338,500	44,500	30,700	33,300
Men	2,110,700	2,546,400	2,715,000	1,913,700	2,277,400	2,429,500	197,000	269,000	285,500	37,900	25,300	27,000
Women	213,900	364,100	419,100	189,800	316,200	366,000	24,100	47,900	53,100	6,600	5,400	6,300
All scientists	1,156,100	1,498,400	1,654,700	1,026,900	1,333,200	1,475,500	129,200	165,200	179,200	21,600	18,000	19,500
Men	953,700	1,167,000	1,270,000	847,900	1,047,200	1,141,100	105,800	119,800	128,900	15,200	13,300	14,000
Women	202,500	331,400	384,600	179,000	334,300	334,300	18,100	45,400	50,300	6,400	4,700	5,500
Physical scientists	196,000	223,200	229,500	168,700	186,900	191,400	27,300	36,300	38,100	4,700	3,700	3,700
Men	174,500	196,100	201,600	152,000	165,200	169,000	22,500	30,900	32,600	4,000	3,000	2,900
Women	21,500	27,100	28,000	16,700	21,700	22,400	4,800	5,400	5,600	700	800	700
Mathematical scientistis	87,800	119,000	132,900	78,000	106,800	118,700	9,800	12,200	14,200	2,400	1,000	1,100
Men	74,300	96,000	104,800	66,100	87,100	94,900	8,200	8,900	9,900	1,900	600	500
Women	13,500	23,000	28,100	11,900	19,700	23,800	1,600	3,300	4,300	400	500	600
Computer specialists	201,500	348,000	420,200	193,300	327,600	397,000	8,200	20,400	23,200	2,600	1,900	2,400
Men	168,300	257,800	309,600	161,000	252,000	302,100	7,300	5,800	7,500	1,600	1,700	2,000
Women	33,200	90,200	110,500	32,300	75,600	94,900	900	14,600	15,600	1,000	200	400
Environmental scientists	64,700	93,000	103,900	57,000	78,800	87,800	7,700	14,200	16,100	1,500	2,400	2,600
Men	60,500	82,300	89,600	53,800	69,800	76,000	6,700	12,500	13,600	1,400	2,100	2,200
Women	4,200	10,700	14,300	3,100	9,000	11,800	1,100	1,700	2,500	100	300	400
Life scientists	279,000	379,600	411,000	257,700	351,400	381,400	21,300	28,200	29,600	4,000	4,100	4,100
Men	232,500	300,300	318,900	213,900	277,600	295,100	18,600	22,700	23,800	2,200	3,100	3,200
Women	46,500	79,200	92,100	43,800	73,800	86,300	2,700	5,400	5,800	1,800	1,000	1,000
Psychologists	109,500	124,400	131,200	99,900	109,700	115,300	9,600	14,700	15,900	2,800	1,700	2,000
Men	74,200	77,100	78,700	68,200	68,400	69,300	6,000	8,700	9,400	1,600	800	800
Women	35,400	47,300	52,500	31,700	41,300	46,000	3,700	6,000	6,500	1,200	900	1,200
Social scientists	217,600	211,400	226,000	172,400	171,900	183,900	45,200	39,500	42,100	3,700	3,300	2,600
Men	169,500	157,400	166,800	132,800	127,100	134,700	36,700	30,300	32,100	2,500	2,100	2,300
Women	48,100	54,000	59,200	39,500	44,800	49,100	8,600	9,200	10,100	1,200	1,100	1,300
All engineers	1,168,400	1,412,100	1,479,400	1,078,600	1,260,400	1,320,100	91,800	151,700	159,300	22,900	12,700	13,800
Men	1,157,000	1,379,400	1,445,000	1,065,900	1,230,200	1,288,400	91,200	149,200	156,600	22,700	12,000	13,000
Women	11,400	32,700	34,500	10,800	30,200	31,700	6,000	2,500	2,800	200	700	800
Astronautical/aeronautical	38,600	47,400	50,200	36,600	43,000	45,200	2,000	4,400	5,000	1,100	500	500
Men	38,000	45,900	49,300	36,100	41,500	44,200	1,900	4,400	5,000	1,100	500	500
Women	600	1,500	900	600	1,500	900	([1])	([1])	([1])	([1])	([1])	([1])
Chemical	60,100	73,400	79,400	57,900	67,200	72,700	2,200	6,200	6,700	600	800	900
Men	58,600	69,800	74,700	56,300	63,800	68,300	2,200	6,000	6,400	500	700	700
Women	1,600	3,600	4,700	1,600	3,400	4,500	([1])	200	200	100	100	200
Civil	151,000	190,300	200,300	145,800	177,000	185,600	5,200	13,300	14,700	3,100	2,100	2,200
Men	149,200	186,400	196,500	144,200	173,300	182,100	5,000	13,100	14,400	3,000	2,100	2,200
Women	1,800	3,900	3,800	1,500	3,700	3,500	300	200	300	100	([1])	([1])
Electrical/electronic	193,900	260,500	279,200	182,900	242,400	260,000	11,000	18,100	19,200	3,000	1,900	2,200
Men	193,100	256,600	275,400	182,200	238,700	256,600	10,900	17,900	18,800	3,000	1,900	2,200
Women	800	3,900	3,800	700	3,600	3,500	100	300	300	([1])	([1])	([1])
Mechanical	203,500	237,400	249,500	193,800	220,000	231,100	9,700	17,400	18,400	3,900	1,500	1,800
Men	202,300	233,700	246,500	192,700	216,300	228,100	9,600	17,400	18,400	3,900	1,400	1,800
Women	1,200	3,800	3,000	1,100	3,800	3,000	100	([1])	([1])	([1])	([1])	([1])
Other	521,300	603,100	620,900	459,500	510,900	525,400	61,800	92,200	95,500	11,200	5,900	6,200
Men	515,800	587,100	602,600	454,300	496,600	509,100	61,500	90,500	93,500	11,200	5,500	5,700
Women	5,500	16,000	18,300	5,200	14,300	16,300	300	1,700	2,000	([1])	400	500

[1] Too few cases to estimate.

NOTE: Detail mail not add to totals because of rounding.

SOURCE: National Science Foundation

Table 71. Scientists and engineers by field, sex, and type of employer: 1976, 1980, and 1981

Field and sex	Total			Business and Industry			Educational Institutions			Federal Government			Other[1]		
	1976	1980	1981	1976	1980	1981	1976	1980	1981	1976	1980	1981	1976	1980	1981
All fields	2,324,500	2,910,500	3,134,100	1,274,900	1,731,000	1,872,900	421,900	510,600	548,300	219,200	251,800	269,000	408,500	417,100	443,900
Men	2,110,700	2,546,400	2,715,000	1,214,400	1,586,900	1,702,300	348,200	402,000	425,600	202,700	223,900	234,700	345,300	333,600	352,400
Women	213,900	364,100	419,100	60,600	144,100	170,500	73,700	108,600	122,700	16,600	27,900	34,300	63,000	83,500	91,600
All scientists	1,156,100	1,498,400	1,654,700	429,600	641,100	728,600	369,700	444,900	477,100	125,900	148,100	162,800	231,000	264,300	286,200
Men	953,700	1,167,000	1,270,000	376,800	522,000	584,300	247,000	338,900	357,400	110,200	122,500	131,000	169,700	183,600	197,300
Women	202,500	331,400	384,600	52,900	119,200	144,200	72,700	106,000	119,700	15,800	25,600	31,800	61,100	80,600	88,900
Physical scientists	196,000	223,200	229,500	100,600	118,300	122,000	48,300	56,500	58,400	19,000	19,900	19,500	28,100	28,500	29,600
Men	174,500	196,100	201,600	91,100	105,300	108,500	42,000	49,000	50,400	17,400	17,200	17,100	24,200	24,600	25,600
Women	21,500	27,100	28,000	9,500	13,100	13,500	6,300	7,600	8,000	1,600	2,600	2,400	4,100	3,800	4,100
Mathematical scientists	87,800	119,000	132,900	27,800	42,100	47,500	39,400	52,300	57,700	11,300	12,700	14,500	9,300	11,900	13,200
Men	74,300	96,000	104,800	24,100	34,200	37,400	33,300	42,700	46,100	10,000	10,800	12,100	7,000	8,300	9,200
Women	13,500	23,000	28,100	3,800	7,900	10,100	6,100	9,700	11,500	1,300	1,800	2,500	2,400	3,600	4,000
Computer specialists	201,500	348,000	420,200	142,000	257,100	315,400	18,800	36,800	42,400	15,500	21,600	24,500	25,000	32,500	37,900
Men	168,300	257,800	309,600	119,100	192,800	234,400	15,900	24,100	28,500	12,900	17,500	19,500	20,400	23,400	27,200
Women	33,200	90,200	110,500	22,900	64,300	81,000	3,000	12,700	13,900	2,600	4,200	5,000	4,600	4,000	10,600
Environmental scientists	64,700	93,000	103,900	29,000	46,900	52,300	13,200	17,200	19,300	11,000	14,600	16,300	11,500	14,300	16,000
Men	60,500	82,300	89,600	27,400	41,800	45,700	11,600	15,000	16,200	10,300	13,200	14,400	11,200	12,300	13,300
Women	4,200	10,700	14,300	1,600	5,100	6,600	1,600	2,200	3,000	600	1,400	1,900	300	2,000	2,800
Life scientists	279,000	379,600	411,000	72,300	107,600	117,600	114,200	154,200	165,800	41,700	50,800	56,100	50,900	66,900	71,500
Men	232,500	300,300	318,900	66,200	92,100	98,900	88,800	115,800	121,600	38,400	44,100	47,400	39,000	48,300	51,000
Women	46,500	79,200	92,100	6,000	15,500	18,700	25,400	38,500	44,200	3,200	6,700	8,700	11,800	18,500	20,500
Psychologists	109,500	124,400	131,200	13,700	19,600	20,200	45,300	49,600	52,400	3,300	2,900	2,900	47,200	52,300	55,700
Men	74,200	77,100	78,700	10,600	13,800	13,800	31,100	31,000	31,000	2,000	1,700	1,700	30,500	30,600	32,300
Women	35,400	47,300	52,500	3,100	5,800	6,500	14,200	18,600	21,400	1,400	1,200	1,200	16,600	21,700	23,400
Social scientists	217,600	211,400	226,000	44,200	49,400	53,600	90,500	78,100	81,200	24,200	25,700	28,900	58,600	58,200	62,300
Men	169,500	157,400	166,800	38,300	42,000	45,700	74,500	61,300	63,500	19,200	18,000	18,900	37,400	36,100	38,700
Women	48,100	54,000	59,200	5,900	7,400	7,900	16,000	16,800	17,700	5,000	7,700	10,000	21,200	22,100	23,600
All engineers	1,168,400	1,412,100	1,479,400	845,300	1,089,900	1,144,300	52,200	65,700	71,200	93,300	103,700	106,200	177,500	152,800	157,700
Men	1,157,000	1,379,400	1,445,000	837,600	1,064,900	1,118,000	51,200	63,100	68,200	92,500	101,400	103,700	175,600	150,000	155,100
Women	11,400	32,700	34,500	7,700	24,900	26,300	1,000	2,600	3,000	800	2,300	2,500	1,900	2,900	2,700
Astronautical/aeronautical	38,600	47,400	50,200	24,800	31,000	32,200	1,500	1,800	2,200	7,900	8,200	8,500	4,400	6,400	7,300
Men	38,000	45,900	49,300	24,300	29,800	31,500	1,500	1,800	2,200	7,800	8,000	8,200	4,400	6,300	7,300
Women	600	1,500	900	500	1,200	700	(2)	(2)	(2)	100	200	200	(2)	100	(2)
Chemical	60,100	73,400	79,400	53,400	64,600	69,900	1,200	4,000	4,600	1,800	2,000	2,000	3,700	2,800	2,900
Men	58,600	69,800	74,700	52,100	61,600	65,900	1,100	3,600	4,100	1,700	2,000	2,000	3,700	2,600	2,700
Women	1,600	3,600	4,700	1,300	3,000	4,000	(2)	400	500	100	(2)	(2)	200	200	200
Civil	151,000	190,300	200,300	68,200	112,900	120,400	5,700	5,700	6,200	16,700	18,200	18,800	60,400	53,500	54,900
Men	149,200	186,400	196,500	67,600	110,600	118,000	5,600	5,500	6,000	16,600	17,800	18,400	59,400	52,500	54,100
Women	1,800	3,900	3,800	600	2,400	2,400	100	200	200	100	400	400	1,000	900	800
Electrical/electronic	193,900	260,500	279,200	145,400	206,400	222,000	10,600	14,400	16,000	20,800	23,400	24,200	17,100	16,300	17,000
Men	193,100	256,600	275,400	144,900	202,800	218,400	10,500	14,300	15,900	20,800	23,300	24,100	16,900	16,200	17,000
Women	800	3,900	3,800	600	3,700	3,500	100	100	100	(2)	100	100	100	(2)	100
Mechanical	203,500	237,400	249,500	166,700	201,400	212,100	10,400	12,800	13,300	12,800	14,400	14,500	13,600	8,800	9,600
Men	202,300	233,700	246,500	165,700	198,100	209,500	10,400	12,500	13,000	12,600	14,200	14,400	13,600	8,800	9,600
Women	1,200	3,800	3,000	1,000	3,200	2,600	100	300	300	200	200	100	(1)	100	(2)
Other	521,300	603,100	620,900	386,800	473,600	487,800	22,700	27,700	28,700	33,300	37,600	38,200	78,500	64,900	66,200
Men	515,800	587,100	602,600	383,000	462,100	474,700	22,000	25,500	26,900	32,900	36,100	36,500	77,900	63,400	64,500
Women	5,500	16,000	18,300	3,700	11,500	13,100	700	1,500	1,900	400	1,500	1,700	700	1,500	1,600

[1] Includes nonprofit organizations; military; state, local and other government; other and no report.

[2] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 72. Scientists and engineers by field, sex, and primary work activity: 1976, 1980 and 1981

Field and sex	Total 1976	Total 1980	Total 1981	Research 1976	Research 1980	Research 1981	Development 1976	Development 1980	Development 1981
All fields	2,324,500	2,910,500	3,134,100	250,400	330,000	355,600	376,600	471,200	515,500
Men	2,110,700	2,546,400	2,715,000	209,000	268,000	285,500	361,900	443,900	482,500
Women	213,900	364,100	419,100	41,500	62,000	70,000	14,700	27,300	33,000
All scientists	1,156,100	1,498,400	1,654,700	199,400	265,300	285,100	80,500	106,900	121,000
Men	953,700	1,167,000	1,270,000	160,000	207,300	219,400	68,900	87,900	97,600
Women	202,500	331,400	384,600	39,400	58,000	65,600	11,600	19,000	23,300
Physical scientists	196,000	223,200	229,500	57,200	67,200	67,600	20,800	27,700	28,300
Men	174,500	196,100	201,600	49,400	58,200	58,700	19,800	25,600	26,000
Women	21,500	27,100	28,000	7,900	9,000	8,800	1,100	2,200	2,300
Mathematical scientists	87,800	119,000	132,900	10,100	12,500	13,000	5,100	6,200	6,900
Men	74,300	96,000	104,800	9,300	10,900	11,200	3,900	5,300	5,800
Women	13,500	23,000	28,100	800	1,600	1,900	1,200	900	1,100
Computer specialists	201,500	348,300	420,200	4,400	10,300	12,000	40,300	47,600	57,800
Men	168,300	257,800	309,600	3,500	8,000	9,300	32,300	36,800	44,200
Women	33,200	90,200	110,500	800	2,400	2,700	7,900	10,800	13,600
Environmental scientists	64,700	93,000	103,900	14,900	21,700	24,100	3,500	6,300	7,800
Men	60,500	82,300	89,600	12,900	19,000	20,500	3,400	5,800	6,800
Women	4,200	10,700	14,300	2,200	2,800	3,600	100	500	1,000
Life scientists	279,000	379,500	411,000	76,600	113,700	124,900	8,200	13,300	14,300
Men	232,500	300,300	318,900	57,800	83,200	89,600	7,100	10,500	11,100
Women	46,500	79,200	92,100	18,800	30,500	35,400	1,100	2,800	3,200
Psychologists	109,500	124,400	131,200	10,300	12,500	13,700	700	1,800	1,700
Men	74,200	77,100	78,700	7,200	8,500	8,800	700	1,000	900
Women	35,400	47,300	52,500	3,100	4,000	5,000	(*)	800	800
Social scientists	217,600	211,400	226,000	25,900	27,200	29,700	1,800	4,100	4,300
Men	169,500	157,400	166,800	20,100	19,500	21,400	1,600	3,000	2,800
Women	48,100	54,000	59,200	5,800	7,700	8,100	200	1,100	1,500
All engineers	1,168,400	1,412,100	1,479,400	51,000	64,700	70,500	296,100	364,300	394,500
Men	1,157,000	1,379,400	1,445,000	49,000	60,700	66,100	293,000	356,000	384,900
Women	11,400	32,700	34,500	2,100	4,000	4,400	3,100	8,300	9,700
Astronautical/aeronautical	38,600	47,400	50,200	4,400	4,600	4,800	13,100	15,400	16,300
Men	38,000	45,900	49,300	4,300	4,400	4,700	12,800	14,900	16,100
Women	600	1,500	900	100	100	100	400	500	200
Chemical	60,100	73,400	79,400	4,800	5,700	6,400	23,500	28,100	31,100
Men	58,600	69,600	74,700	4,600	5,000	5,600	23,400	26,800	29,400
Women	1,600	3,800	4,700	300	600	900	100	1,200	1,700
Civil	151,100	190,300	200,300	3,000	4,600	5,200	28,200	34,700	38,300
Men	149,200	186,400	196,500	2,800	4,400	5,100	27,700	33,500	37,100
Women	1,800	3,900	3,800	200	100	100	500	1,200	1,200
Electrical/electronic	193,900	260,500	279,200	9,800	14,200	16,000	78,300	107,100	116,800
Men	193,100	256,600	275,400	9,800	14,100	15,900	78,000	105,200	114,400
Women	800	3,900	3,800	(*)	100	100	300	1,900	2,400
Mechanical	203,500	237,400	249,500	8,000	10,500	11,500	82,600	93,900	102,000
Men	202,300	233,700	246,500	7,900	10,300	11,400	82,300	92,800	100,600
Women	1,200	3,800	3,000	100	300	100	400	1,000	1,300
Other	521,300	603,100	620,900	20,900	25,100	26,700	70,300	85,100	90,100
Men	515,800	587,100	602,600	19,500	22,400	23,500	68,800	82,600	87,200
Women	5,500	16,000	18,300	1,400	2,700	3,200	1,500	2,500	2,900

Table 72. Scientists and engineers by field, sex, and primary work activity: 1976, 1980 and 1981 — Con.

Field and sex	Management[1]			Teaching			Other[2]		
	1976	1980	1981	1976	1980	1981	1976	1980	1981
All fields	606,500	660,800	674,300	229,800	268,200	288,900	861,300	1,180,300	1,299,800
Men	581,100	627,300	637,600	189,100	207,600	220,000	769,300	999,600	1,089,400
Women	25,400	33,500	36,700	40,700	60,600	69,000	91,700	180,700	210,400
All scientists	249,600	265,900	275,000	202,000	235,700	254,300	424,700	624,600	719,300
Men	225,700	235,700	241,300	161,400	175,600	186,100	337,300	460,500	525,600
Women	23,900	30,300	33,700	40,600	60,000	68,300	86,900	164,100	193,700
Physical scientists	39,400	41,100	41,000	22,200	26,100	28,300	56,300	61,100	64,300
Men	37,300	39,000	38,900	20,000	22,300	23,800	48,100	51,000	54,200
Women	2,100	2,100	2,200	2,200	3,800	4,400	8,200	10,000	10,300
Mathematical scientists	16,700	17,900	18,400	31,500	40,200	44,100	24,400	42,200	50,600
Men	15,900	16,100	16,300	26,600	32,500	35,000	18,600	31,200	36,500
Women	900	1,800	2,200	4,900	7,700	9,100	5,700	11,000	13,800
Computer specialists	30,700	39,200	42,600	7,100	9,000	10,800	119,100	241,900	297,000
Men	28,400	34,800	37,800	5,500	7,100	8,700	98,400	171,100	209,600
Women	2,300	4,400	4,800	1,600	2,000	2,100	20,700	70,800	87,300
Environmental scientists	15,000	15,900	16,700	6,800	9,100	10,200	24,600	40,000	45,100
Men	14,800	15,100	15,700	6,100	8,200	9,000	23,600	34,200	37,600
Women	200	800	1,000	700	800	1,200	1,100	5,800	7,500
Life scientists	66,500	77,000	79,700	45,000	59,000	62,300	82,600	116,600	129,600
Men	63,100	70,900	72,800	34,900	44,600	46,200	69,500	91,100	99,200
Women	3,400	6,100	6,900	10,100	14,400	16,100	13,100	25,400	30,500
Psychologists	18,700	20,600	21,300	31,900	37,500	40,300	48,000	52,000	54,200
Men	15,000	15,400	15,300	21,000	21,100	22,200	30,100	31,100	31,500
Women	3,700	5,200	6,100	10,900	16,400	18,100	17,700	20,900	22,500
Social scientists	62,700	54,300	55,200	57,500	54,700	58,300	69,700	71,100	78,500
Men	51,300	44,300	44,600	47,200	39,800	41,100	49,300	50,800	56,900
Women	11,400	10,000	10,600	10,300	14,900	17,200	20,300	20,300	21,600
All engineers	356,900	394,900	399,300	27,800	32,500	34,600	436,800	555,700	580,500
Men	355,400	391,600	396,300	27,700	32,000	33,900	432,000	539,100	563,800
Women	1,500	3,200	3,000	100	600	700	4,800	16,600	16,700
Astronautical/aeronautical	9,500	10,400	10,900	900	1,000	1,000	10,700	16,000	17,200
Men	9,500	10,200	10,900	900	1,000	1,000	10,500	15,400	16,600
Women	(³)	300	(³)	(³)	(³)	(³)	100	600	600
Chemical	13,000	12,700	13,100	600	1,200	1,400	18,200	25,700	27,400
Men	12,800	12,700	13,100	600	1,200	1,300	17,200	24,100	25,300
Women	200	100	100	(³)	(³)	100	1,000	1,700	1,900
Civil	47,100	57,400	58,700	3,100	4,500	4,700	69,600	89,100	93,400
Men	46,900	56,700	57,900	3,100	4,500	4,600	68,700	87,300	91,800
Women	200	800	800	100	100	100	900	1,700	1,600
Electrical/electronic	39,700	45,000	45,900	5,700	7,200	7,700	60,400	87,000	92,800
Men	39,600	44,700	45,600	5,700	7,200	7,600	60,000	85,400	91,900
Women	(³)	300	200	(³)	(³)	(³)	500	1,600	1,100
Mechanical	44,300	47,900	47,800	5,300	5,500	5,600	63,300	79,600	82,600
Men	44,000	47,500	47,500	5,300	5,400	5,500	62,800	77,700	81,500
Women	300	400	200	(³)	100	(³)	400	2,000	1,400
Other	203,400	221,400	223,000	12,100	13,100	14,200	214,600	258,400	266,900
Men	202,700	220,000	221,300	12,100	12,700	13,800	212,700	249,400	256,800
Women	700	1,400	1,700	(³)	400	400	1,900	9,000	10,100

[1] Includes management of research and development.

[2] Includes consulting; production/inspection; reporting, statistical work, computing; other activities and no report.

[3] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 73. Scientists and engineers by field, labor force status, and race: 1976, 1980, and 1981

Field and race	Total			Labor force			Outside labor force		
	1976	1980	1981	1976	1980	1981	1976	1980	1981
Total, all fields	2,523,600	3,149,500	3,381,100	2,369,000	2,941,200	3,167,400	154,600	208,300	213,700
White	2,415,300	2,997,100	3,209,800	2,264,000	2,796,500	3,004,900	151,300	200,600	204,900
Black	37,600	59,800	69,700	35,800	56,300	65,800	1,800	3,500	3,900
Asian	57,900	81,900	89,500	56,900	78,100	84,900	1,100	3,800	4,600
Other[1]	12,700	10,600	12,200	12,400	10,300	11,800	400	400	300
All scientists	1,256,900	1,625,800	1,788,000	1,177,700	1,516,400	1,674,200	79,200	108,400	113,800
White	1,195,700	1,538,400	1,687,800	1,119,200	1,434,600	1,580,100	75,900	103,800	107,800
Black	26,200	40,600	47,800	24,600	38,000	44,900	1,600	2,600	2,900
Asian	28,400	41,300	45,600	27,800	38,700	42.600	700	2,600	3,000
Other[1]	6,500	5,300	6,800	6,200	5,100	6,600	400	200	100
Physical scientists	223,600	264,800	271,800	200,700	226,900	233,200	22,900	37,900	38,600
White	210,600	249,100	255,600	188,200	213,100	219,100	22,400	36,000	36,500
Black	4,700	5,300	6,000	4,600	4,800	5,100	100	800	900
Asian	7,200	9,700	9,900	7,000	8,700	8,700	300	1,000	1,100
Other[1]	1,100	400	400	900	300	300	200	100	(²)
Mathematical scientists	96,000	127,300	141,600	90,200	120,000	134,000	5,800	7,300	7,600
White	88,000	118,000	131,000	82,500	111,100	124,000	5,400	6,900	7,000
Black	5,100	5,000	5,500	4,800	4,800	5,200	300	200	300
Asian	2,600	3,800	4,400	2,600	3,600	4,100	100	200	300
Other[1]	300	500	700	300	500	700	(²)	(²)	(²)
Computer specialists	209,500	357,400	430,400	204,100	349,900	422,500	5,400	7,500	7,900
White	199,300	335,600	401,700	194,100	328,600	394,300	5,300	7,000	7,400
Black	3,500	7,700	10,900	3,400	7,500	10,700	100	200	200
Asian	5,100	13,200	16,100	5,000	12,900	15,800	100	300	300
Other[1]	1,600	900	1,700	1,600	900	1,700	(²)	(²)	(²)
Environmental scientists	70,800	103,700	116,100	66,300	95,400	106,500	4,600	8,300	9,600
White	68,700	101,500	113,600	64,200	93,400	104,200	4,600	8,100	9,300
Black	700	600	800	700	500	600	(²)	100	100
Asian	1,200	1,100	1,300	1,200	1,000	1,200	(²)	100	100
Other[1]	200	500	500	200	500	500	(²)	(²)	(²)
Life scientists	298,300	407,200	439,800	282,900	383,600	415,100	15,400	23,600	24,600
White	285,100	387,900	418,700	270,100	365,300	395,200	14,900	22,500	23,500
Black	4,400	7,600	8,600	4,400	7,300	8,300	(²)	200	300
Asian	7,300	10,000	10,300	7,000	9,200	9,500	300	800	800
Other[1]	1,500	1,800	2,200	1,400	1,800	2,200	100	100	100
Psychologists	118,200	134,000	141,700	112,300	126,000	133,200	5,900	8,000	8,500
White	113,700	129,500	136,800	107,800	121,700	128,600	5,900	7,800	8,300
Black	3,100	3,600	4,000	3,100	3,300	3,800	(²)	200	200
Asian	500	600	600	500	600	600	(²)	(²)	(²)
Other[1]	900	300	300	900	300	300	(²)	(²)	(²)
Social scientists	240,500	231,300	246,600	221,300	214,700	229,600	19,100	16,700	17,000
White	230,200	216,900	230,400	212,200	201,400	214,700	18,000	15,500	15,700
Black	4,700	10,600	12,100	3,600	9,800	11,300	1,100	800	800
Asian	4,500	3,000	3,100	4,500	2,700	2,700	(²)	300	400
Other[1]	1,000	900	1,000	1,000	800	900	(²)	100	100
All engineers	1,266,700	1,523,700	1,593,100	1,191,300	1,424,800	1,493,200	75,400	99,000	99,900
White	1,219,600	1,458,700	1,522,000	1,144,800	1,361,900	1,424,800	74,800	96,800	97,100
Black	11,400	19,200	21,900	11,200	18,300	20,900	200	900	1,000
Asian	29,500	40,600	43,900	29,100	39,400	42,300	400	1,200	1,600
Other[1]	6,200	5,300	5,400	6,200	5,200	5,200	(²)	200	200

[1] Includes American Indians, other and no report.

[2] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 74. Scientists and engineers by field, employment status, and race: 1976, 1980, and 1981

Field and race	Total Employed											
	Total			Employed in S/E			Employed in non-S/E			Unemployed, seeking		
	1976	1980	1981	1976	1980	1981	1976	1980	1981	1976	1980	1981
Total, all fields	2,324,500	2,910,500	3,134,100	2,103,500	2,593,600	2,795,600	221,000	316,900	338,500	44,500	30,700	33,300
White	2,222,100	2,768,200	2,974,700	2,009,200	2,464,800	2,650,900	212,900	303,400	323,800	41,900	28,300	30,200
Black	34,400	55,100	64,100	30,500	47,800	55,900	3,900	7,300	8,200	1,400	1,200	1,700
Asian	56,200	76,800	83,500	53,200	72,000	78,500	3,000	4,800	5,000	700	1,300	1,400
Other[1]	11,900	10,300	11,800	10,600	8,900	10,400	1,300	1,400	1,400	500	([2])	([2])
All scientists	1,156,100	1,498,400	1,654,700	1,026,900	1,333,200	1,475,500	129,200	135,200	179,200	21,600	18,000	19,500
White	1,099,100	1,418,400	1,562,800	974,700	1,262,000	1,393,700	124,400	156,400	169,100	20,100	16,200	17,300
Black	23,600	36,900	43,500	20,800	30,800	36,400	2,800	6,100	7,100	1,000	1,100	1,400
Asian	27,300	37,800	41,700	25,900	35,600	39,400	1,400	2,200	2,300	500	900	900
Other[1]	6,100	5,100	6,600	5,500	4,600	6,100	600	500	500	100	([2])	([2])
Physical scientists	196,000	223,200	229,500	168,700	186,900	191,400	27,300	36,300	38,100	4,700	3,700	3,700
White	183,900	209,700	215,700	158,300	175,400	179,700	25,600	34,300	36,000	4,300	3,400	3,400
Black	4,400	4,700	5,000	3,600	3,600	3,800	800	1,100	1,200	200	100	100
Asian	6,700	8,500	8,500	6,100	7,700	7,700	600	800	800	300	200	200
Other[1]	900	300	300	800	200	200	100	100	100	([2])	([2])	([2])
Mathematical scientists	87,800	119,000	132,900	78,000	106,800	118,700	9,800	12,200	14,200	2,400	1,000	1,100
White	80,100	110,100	122,900	70,800	96,900	109,800	9,300	11,200	13,100	2,400	1,000	1,100
Black	4,800	4,800	5,200	4,300	3,800	4,300	500	1,000	900	([2])	([2])	([2])
Asian	2,600	3,600	4,100	2,600	3,600	4,000	([2])	([2])	100	([2])	([2])	([2])
Other[1]	300	500	700	300	500	700	([2])	([2])	([2])	([2])	([2])	([2])
Computer specialists	201,500	348,000	420,200	193,300	327,600	397,000	8,200	20,400	23,200	2,600	1,900	2,400
White	192,100	327,300	392,900	184,500	308,000	371,300	7,600	19,300	21,600	2,000	1,300	1,400
Black	2,800	7,300	10,200	2,500	6,700	9,000	300	600	1,200	600	200	500
Asian	5,000	12,500	15,400	4,800	12,100	15,100	200	400	300	([2])	400	400
Other[1]	1,600	900	1,700	1,500	800	1,600	100	100	100	([2])	([2])	([2])
Environmental scientists	64,700	93,000	103,900	57,000	78,800	87,800	7,700	14,200	16,100	1,500	2,400	2,600
White	62,800	91,100	101,600	55,200	77,200	86,000	7,600	13,900	15,600	1,400	2,300	2,600
Black	600	500	600	400	400	400	200	100	200	100	([2])	([2])
Asian	1,100	900	1,100	1,100	700	900	([2])	200	200	100	100	100
Other[1]	200	500	500	200	500	400	([2])	([2])	100	([2])	([2])	([2])
Life scientists	279,000	379,600	411,000	257,700	351,400	381,400	21,300	28,200	29,600	4,000	4,100	4,100
White	266,200	361,300	391,200	245,400	334,300	362,700	20,800	27,000	28,500	3,900	4,000	4,000
Black	4,400	7,300	8,300	4,200	6,600	7,500	200	700	800	([2])	([2])	([2])
Asian	6,900	9,100	9,400	6,900	8,800	9.000	([2])	300	400	100	100	100
Other[1]	1,400	1,800	2,200	1,200	1,800	2,100	200	([2])	100	([2])	([2])	([2])
Psychologists	109,500	124,400	131,200	99,900	109,700	115,300	9,600	14,700	15,900	2,800	1,700	2,000
White	105,200	120,300	127,000	96,000	106,200	111,600	9,200	14,100	15,400	2,600	1,400	1,600
Black	3,100	3,300	3,400	3,000	2,800	3,100	100	500	300	([2])	300	400
Asian	500	500	600	400	500	500	100	([2])	100	([2])	([2])	([2])
Other[1]	700	300	300	500	200	100	200	100	200	200	([2])	([2])
Social scientists	217,600	211,400	226,000	172,400	171,900	183,900	45,200	39,500	42,100	3,700	3,300	3,600
White	208,600	198,600	211,600	164,400	162,100	172,600	44,200	36,500	39,000	3,600	2,800	3,100
Black	3,500	9,400	11,000	2,900	6,900	8,300	600	2,500	2,700	100	400	300
Asian	4,500	2,600	2,600	4,000	2,300	2,200	500	300	400	([2])	100	100
Other[1]	1,000	800	900	1,000	700	800	([2])	100	100	([2])	([2])	([2])
All engineers	1,168,400	1,412,100	1,479,400	1,076,600	1,260,400	1,320,100	91,800	151,700	159,300	22,900	12,700	13,800
White	1,123,000	1,349,800	1,411,900	1,034,500	1,202,800	1,257,200	88,500	147,000	154,700	21,800	12,100	12,900
Black	10,800	18,200	20,600	9,700	17,000	19,500	1,100	1,200	1,100	400	100	300
Asian	28,900	39,000	41,800	27,300	36,400	39,100	1,600	2,600	2,700	200	400	500
Other[1]	5,800	5,200	5,200	5,100	4,300	4,300	700	900	900	400	([2])	([2])

[1] Includes American Indians, other, and no report.

[2] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 75. Selected characteristics of employed doctoral scientists and engineers in the United States: 1973, 1977, 1979, and 1981

Characteristics	1973			1977			1979			1981		
	Number	Percent	Median annual salary	Number	Percent	Median annual salary	Number	Percent	Median annual salary	Number	Percent	Median annual salary
Total	220,410	100.0	$20,700	284,237	100.0	$25,600	313,736	100.0	$29,100	343,358	100.0	$34,700
Field:												
Physical scientists	48,466	22.0	21,000	57,450	20.2	26,600	60,170	19.2	30,300	63,189	18.4	36,200
Chemists	30,704	13.9	21,000	37,314	13.1	26,600	39,569	12.6	30,400	41,971	12.2	36,200
Physicists/astronomers	17,762	8.1	21,000	20,136	7.1	26,500	20,601	6.6	30,100	21,218	6.2	36,100
Mathematical scientists	12,145	5.5	19,200	14,573	5.1	23,300	15,297	4.9	26,300	15,594	4.5	31,300
Mathematicians	10,686	4.8	19,000	12,860	4.5	23,100	12,930	4.1	26,100	13,038	3.8	30,900
Statisticians	1,459	.7	20,900	1,713	.6	25,100	2,367	.8	29,300	2,556	.7	34,600
Computer specialists	2,692	1.2	21,700	5,767	2.0	25,800	6,139	2.1	28,500	9,048	2.6	34,400
Environmental scientists	10,329	4.7	20,700	13,026	4.6	25,800	14,609	4.7	30,300	16,029	4.7	36,500
Earth scientists	8,534	3.9	20,700	9,765	3.4	25,900	11,144	3.6	30,300	12,121	3.5	37,000
Oceanographers	1,157	.5	19,800	1,563	.5	24,100	1,662	.6	28,800	1,782	.5	32,100
Atmospheric scientists	638	.3	22,500	1,698	.6	28,300	1,803	.6	31,300	2,126	.6	36,300
Engineers	35,775	16.2	22,300	45,046	15.8	28,600	50,222	16.0	33,100	56,953	16.6	40,200
Life scientists	58,047	26.3	20,100	71,924	25.3	24,700	80,090	25.5	28,100	86,715	25.2	33,200
Biological scientists	36,859	16.7	19,400	42,161	14.8	23,800	45.746	14.6	26,500	49,673	14.5	31,600
Agricultural scientists	10,553	4.8	19,900	14,293	5.0	24,800	15,061	4.8	29,000	15,879	4.6	33,600
Medical scientists	10,635	4.8	22,700	15,470	5.4	28,000	19,283	6.1	30,900	21,163	6.2	37,900
Psychologists	24,850	11.3	20,200	33,724	11.9	24,100	37,987	12.1	26,700	43,064	12.5	30,700
Social scientists	28,106	12.8	20,300	42,727	15.0	24,100	48,622	15.5	26,200	52,946	15.4	30,800
Economists	8,289	3.8	22,300	10,790	3.8	27,000	11,718	3.7	31,000	13,426	3.9	36,500
Sociologists/anthropologists	6,530	3.0	19,300	9,493	3.3	22,200	10,224	3.3	23,900	10,996	3.2	28,500
Other social scientists	13,287	6.0	19,500	22,444	7.9	23,200	26,680	8.5	25,300	28,522	8.3	29,900
Sex:												
Men	203,452	92.3	21,000	256,735	90.3	26,000	280,393	89.4	29,900	302,596	88.1	35,600
Women	16,958	7.7	17,400	27,502	9.7	20,700	33,343	10.6	23,100	40,942	11.9	27,000
Race:												
White	200,691	91.1	21,000	253,309	89.1	25,700	276,872	88.2	29,200	304,398	88.6	34,800
Black	2,034	.9	21,200	2,744	1.0	23,800	3,420	1.1	26,600	4,320	1.3	31,700
Am. Indian	340	.2	(¹)	597	.2	23,900	926	.3	25,800	2,198	.6	35,500
Asian	8,989	4.1	20,000	15,242	5.4	23,800	21,031	6.7	28,200	26,877	7.8	34,200
No report	8,356	3.8	20,800	12,345	4.3	25,700	11,487	3.7	29,800	5,745	1.7	35,900
Age:												
Under 30	9,669	4.4	15,400	8,474	3.0	18,500	7,478	2.4	21,300	8,355	2.4	25,900
30-34	49,726	22.6	17,300	53,562	18.8	20,400	52,703	16.8	22,800	51,275	14.9	27,500
35-39	42,064	19.1	19,600	66,741	23.5	23,600	75,887	24.2	26,600	76,901	22.4	31,400
40-44	35,304	16.0	21,800	45,147	15.9	26,500	54,296	17.3	30,200	67,516	19.7	35,500
45-49	29,945	13.6	24,100	37,626	13.2	29,200	39,860	12.7	32,000	44,006	12.8	37,600
50-54	24,109	10.9	24,900	30,935	10.9	30,900	33,104	10.6	34,100	36,467	10.6	40,200
55-59	15,579	7.1	25,200	22,507	7.9	31,600	26,501	8.4	36,100	29,912	8.7	41,500
60-64	8,982	4.1	25,500	12,944	4.6	31,400	15,438	4.9	36,000	18,811	5.6	41,100
65 & over	4,876	2.2	24,700	5,974	2.1	31,200	7,951	2.5	35,700	10,262	3.0	41,100
No report	151	.1	24,300	327	.1	26,600	520	.2	23,100	33	(³)	(²)
Sector of employment:												
Business & industry	53,403	24.2	23,300	71,464	25.1	29,900	82,824	26.4	33,800	49,020	28.8	40,300
Educational institutions	129,408	58.7	19,100	163,101	57.4	23,700	173,966	55.4	26,400	186,869	54.4	31,100
4-year coll./univ.	124,901	56.7	19,200	156,452	55.0	23,800	166,965	53.2	26,400	179,010	52.1	31,300
2-year college	2,962	1.3	17,800	4,634	1.6	20,900	4,512	1.4	24,600	5,035	1.5	28,200
Elem./sec. school	1,545	.7	19,300	2,015	.7	22,400	2,496	.8	25,800	2,764	.8	28,700
Hospital/clinic	4,543	2.1	19,400	8,567	3.0	23,600	9,706	3.1	26,200	9,862	2.9	31,000
Nonprofit organizations	8,006	3.6	21,700	10,188	3.6	26,800	12,549	4.0	26,200	12,581	3.7	34,800
Federal Government	18,200	8.3	23,500	21,353	7.5	29,700	23,923	7.6	30,300	25,087	7.3	40,300
Military/Commissioned Corps	1,977	.9	(²)	2,282	.8	(²)	2,304	.7	33,400	2,052	.6	(²)
State government	3,001	1.4	19,500	3,783	1.3	21,600	4,175	1.3	(¹)	4,454	1.3	29,300
Other government	1,255	.6	19,000	1,545	.5	22,100	1,943	.6	23,500	2,088	.6	27,200
Other	331	.2	21,100	584	.2	37,500	945	.3	23,000	992	.3	61,500
No report	286	.1	(¹)	1,350	.5	(¹)	1,401	.4	42,700	613	.2	(²)
Primary work activity:												
Research and development	97,683	44.3	21,700	124,193	43.7	27,300	142,743	45.5	30,900	152,757	35.0	35,200
Basic research	34,258	15.5	19,900	43,545	15.3	24,600	47,864	15.3	27,700	55,265	16.1	33,100
Applied research	28,700	13.0	21,000	36,413	12.8	26,300	36,842	11.7	30,000	46,475	13.5	36,000
Development	8,502	3.9	21,100	13,502	4.8	26,100	14,995	4.8	30,800	18,368	5.3	36,500
R&D management[4]	26,223	11.9	27,000	30,733	10.8	33,100	43,042	13.7	35,900	32,649	9.5	45,800
Management or administration	19,949	9.1	25,700	29,731	10.5	30,600	29,182	9.3	32,400	27,863	8.1	39,900
Teaching	80,012	36.3	18,900	90,392	31.8	22,600	91,922	29.3	25,200	104,956	30.6	30,100
Consulting	4,055	1.8	23,200	6,141	2.2	28,200	8,998	2.9	31,300	12,035	3.5	39,500
Sales/professional services	8,084	3.7	20,700	15,183	5.3	24,700	21,049	6.7	29,000	25,724	7.5	34,900
Other	6,959	3.2	(²)	12,785	4.5	24,900	15,679	5.0	24,900	16,441	4.8	34,600
No report	3,688	1.7	21,400	5,812	2.0	25,400	4,163	1.3	29,900	3,962	1.2	35,200

[1] No median computed for groups with fewer than 20 individuals reporting salary.

[2] Data not available.

[3] Less than 0.5 percent.

[4] The classification of management or administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

NOTE: Percents may not add to 100 because of rounding. Median salaries computed for full-time employed civilians only.

SOURCE: National Science Foundation

Table 76. Employed doctoral scientists and engineers by field and type of employer: 1973, 1977, 1979, and 1981

Field	Educational institutions				Business and industry				Federal Government			
	1973	1977	1979	1981	1973	1977	1979	1981	1973	1977	1979	1981
Total, all fields	129,400	163,100	174,000	186,800	53,400	71,500	82,800	99,000	18,200	21,400	23,900	25,100
Physical scientists	22,000	27,100	27,200	28,300	19,700	23,000	25,000	27,400	4,100	3,900	4,600	4,300
Mathematical scientists	10,500	12,200	12,600	12,700	900	1,300	1,400	1,600	500	600	800	900
Computer specialists	1,400	2,100	2,500	3,000	1,000	3,100	3,700	5,200	100	300	300	400
Environmental scientists	5,200	6,300	6,200	6,800	2,200	3,100	4,200	4,800	2,000	2,400	2,700	3,100
Engineers	13,000	15,900	17,000	18,100	17,800	22,900	4,200	31,700	2,700	3,500	3,600	3,800
Life scientists	39,200	47,500	52,300	56,800	7,200	10,100	11,500	13,500	6,100	6,800	7,500	7,600
Psychologists	15,100	18,600	19,900	21,800	3,100	5,500	7,100	10,100	1,200	1,200	1,100	1,200
Social scientists	23,300	33,400	36,300	39,300	1,600	2,600	3,500	4,700	1,500	2,600	3,300	3,900
	Percent distribution											
Total, all fields	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Physical scientists	17.0	16.6	15.6	15.1	36.8	32.2	30.2	27.7	22.5	18.5	19.2	17.1
Mathematical scientists	8.1	7.5	7.2	6.8	1.6	1.8	1.7	1.6	2.7	2.8	3.3	3.6
Computer specialists	1.1	1.3	1.4	1.6	1.9	4.3	4.5	5.3	.7	1.2	1.3	1.6
Environmental scientists	4.0	3.9	3.6	3.6	4.1	4.3	5.1	4.8	10.8	11.5	11.3	12.4
Engineers	10.1	9.8	9.8	9.7	33.3	32.0	31.9	32.0	15.0	16.5	15.1	15.1
Life scientists	30.3	29.1	30.1	30.4	13.6	14.1	13.9	13.6	33.6	31.7	31.4	30.3
Psychologists	11.7	11.4	11.4	11.7	5.8	7.7	8.6	10.2	6.8	5.8	4.6	4.8
Social scientists	17.8	20.5	20.9	21.0	3.0	3.6	4.2	4.7	8.0	12.4	13.8	15.5

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 77. Doctoral scientists and engineers by primary work activity and type of employer: 1973, 1977, 1979, and 1981

Primary work activity	Educational institutions				Business and industry				Federal Government			
	1973	1977	1979	1981	1973	1977	1979	1981	1973	1977	1979	1981
Total	129,400	163,100	174,000	186,800	53,400	71,500	82,800	99,000	18,200	21,400	23,900	25,100
Research and development	30,700	42,600	46,800	52,600	23,800	31,300	30,800	43,600	10,000	10,900	12,200	13,700
Basic research	22,500	30,000	33,200	37,900	3,500	4,600	4,700	6,300	4,700	4,700	5,400	6,100
Applied research	7,600	11,100	12,500	13,700	13,200	16,500	14,300	21,800	4,800	5,200	5,700	6,800
Development	600	1,500	1,100	1,000	7,000	10,200	11,800	15,400	500	900	1,100	800
Management/administration	13,600	20,000	26,500	18,800	19,800	23,900	23,900	24,600	6,200	7,700	8,400	7,800
Management of R&D	4,500	6,100	8,300	4,400	14,200	15,900	23,800	18,500	4,500	5,400	6,700	5,800
Other than R&D	6,200	10,100	18,200	14,500	3,500	6,100	4,100	6,100	1,000	1,500	1,700	1,900
Of both[1]	2,900	3,800	—	—	2,100	1,900	—	—	700	700	—	—
Teaching	78,600	89,300	90,900	103,900	200	200	200	500	200	200	200	100
Other[2]	6,100	11,200	9,800	11,400	9,600	15,900	23,900	30,300	1,700	2,700	3,200	3,500
	Percent distribution											
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Research and development	23.7	26.1	26.9	28.2	44.5	43.8	37.2	44.1	55.0	50.8	50.7	54.6
Basic research	17.4	18.4	19.1	20.3	6.6	6.5	5.7	6.4	26.0	22.1	22.6	24.2
Applied research	5.9	6.8	7.2	7.3	24.7	23.1	17.3	22.1	26.4	24.4	23.8	27.3
Development	.5	.9	6.3	.6	13.1	14.2	14.3	15.6	2.6	4.3	4.6	3.1
Management/administration	10.5	12.3	15.2	10.1	37.2	33.5	33.7	24.9	34.0	35.9	34.9	30.9
Management of R&D	3.5	3.8	4.8	2.3	26.7	22.3	28.7	18.7	24.7	25.3	28.0	23.3
Other than R&D	4.8	6.2	10.5	7.7	6.5	8.6	5.0	6.1	5.7	7.2	7.1	7.6
Of both[1]	2.2	2.3	—	—	4.0	2.6	—	—	3.6	3.4	—	—
Teaching	61.0	54.7	52.2	55.6	.4	.3	.2	.5	1.4	.7	.8	.4
Other[2]	4.7	6.8	5.6	6.1	18.0	22.3	28.9	30.6	9.6	12.6	13.4	14.1

[1] The Classification of Management or Administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

[2] Includes consulting, sales/professional services, other, and no report.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 78. Selected characteristics of employed women doctoral scientists and engineers in the United States: 1973, 1977, 1979 and 1981

Characteristics	1973				1977				1979				1981			
	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary
Total	16,958	100.0	7.7	$17,400	27,502	100.0	9.7	$20,700	33,343	100.0	10.6	$23,100	40,942	100.0	11.9	27,000
Field:																
Physical scientists	1,897	11.2	3.9	17,400	2,908	10.6	5.1	21,200	3,123	9.4	5.2	24,400	3,770	9.2	6.0	29,400
Chemists	1,461	8.6	4.8	17,300	2,354	8.6	6.3	20,900	2,546	7.6	6.4	24,200	3,160	7.7	7.5	29,100
Physicists/astronomers	436	2.6	2.5	17,700	554	2.0	2.8	23,100	577	1.7	2.8	25,400	610	1.5	2.9	31,200
Mathematical scientists	775	4.6	6.4	17,100	1,048	3.8	7.2	19,900	1,138	3.4	7.4	21,700	1,315	3.2	8.4	26,800
Mathematicians	701	4.1	6.6	16,800	934	3.4	7.3	19,900	977	2.9	7.6	21,800	1,039	2.5	8.0	26,700
Statisticians	74	.4	5.1	19,500	114	.4	6.7	19,800	161	.5	6.8	21,600	276	.7	10.8	27,000
Computer specialists	88	.5	3.3	17,700	233	.8	4.0	20,800	366	1.1	5.4	22,800	701	1.7	7.7	28,700
Environmental scientists	262	1.5	2.5	17,000	439	1.6	3.4	19,700	607	1.8	4.2	23,500	863	2.1	5.4	29,200
Earth scientists	205	1.2	2.4	16,700	293	1.1	3.0	20,000	410	1.2	3.7	25,300	578	1.4	4.8	30,000
Oceanographers	37	.2	3.2	(1)	75	.3	4.8	19,200	152	.5	9.1	21,500	203	.5	11.4	28,700
Atmospheric scientists	20	.1	3.1	(1)	71	.3	4.2	19,200	45	.1	2.5	(1)	82	.2	3.9	28,000
Engineers	139	.8	.4	19,600	283	1.0	.6	22,900	527	1.6	1.0	26,600	759	1.9	1.3	32,000
Life scientists	6,120	36.1	10.5	17,300	8,983	32.7	12.5	21,000	11,142	33.4	13.9	23,000	13,244	32.3	15.3	27,100
Biological scientists	4,896	28.9	13.3	17,100	6,684	24.3	15.9	20,500	7,882	23.6	17.2	22,200	9,032	22.1	18.2	26,300
Agricultural scientists	131	.8	1.2	(1)	264	1.0	1.8	20,200	320	1.0	2.1	21,600	436	1.1	2.7	26,200
Medical scientists	1,093	6.4	10.3	18,300	2,035	7.4	13.2	22,800	2,940	8.8	15.2	25,300	3,776	9.2	17.8	29,500
Psychologists	4,782	28.2	19.2	18,200	7,645	27.8	22.7	20,600	9,216	27.6	24.3	23,200	11,860	29.0	27.5	26,200
Social scientists	2,895	17.1	10.3	17,600	5,963	21.7	14.0	20,200	7,224	21.7	14.9	22,600	8,430	20.6	15.9	25,900
Economists	476	2.8	5.7	19,300	788	2.9	7.3	23,600	977	2.9	8.3	26,900	1,131	2.8	8.4	31,400
Sociologists/anthropologists	1,227	7.2	18.8	17,100	2,286	8.3	24.1	19,700	2,558	7.7	25.0	22,100	2,934	7.2	26.7	25,100
Other social scientists	1,192	7.0	9.0	17,400	2,889	10.5	12.9	19,800	3,689	11.1	13.8	22,300	4,365	10.7	15.3	25,800
Age:																
Under 30	1,026	6.1	10.6	14,400	1,640	6.0	19.4	17,400	1,464	4.4	19.6	18,700	1,798	4.4	21.5	24,100
30-34	3,546	20.9	7.1	14,900	6,621	24.1	12.4	18,400	8,450	25.3	16.0	20,600	9,313	22.7	18.2	24,100
35-39	2,767	16.3	6.6	16,600	5,641	20.5	8.5	20,000	7,440	22.3	9.8	22,400	10,233	25.0	13.3	25,700
40-44	2,445	14.4	6.9	17,900	3,479	12.6	7.7	21,700	4,740	14.2	8.7	24,600	6,455	15.8	9.6	28,400
45-49	2,488	14.7	8.3	18,700	3,291	12.0	8.7	23,100	3,345	10.0	8.4	25,500	4,092	10.0	9.3	29,100
50-54	1,845	10.9	7.7	19,500	2,887	10.5	9.3	24,700	3,147	9.4	9.5	26,700	3,467	8.5	9.5	30,700
55-59	1,379	8.1	8.9	20,200	1,876	6.8	8.3	24,200	2,307	6.9	8.7	28,700	2,836	6.9	9.5	33,000
60-64	847	5.0	9.4	20,500	1,233	4.5	9.5	25,000	1,392	4.2	9.0	29,200	1,601	3.9	8.5	33,400
65 & over	570	3.4	11.7	19,800	726	2.6	12.2	25,100	913	2.7	11.5	29,700	1,114	2.7	10.9	33,100
No report	45	.3	28.8	(1)	108	.4	33.0	(1)	145	.4	27.9	(1)	33	.1	100.0	(2)
Sector of employment:																
Business & industry	1,363	8.0	2.6	19,700	2,959	10.8	4.1	24,400	4,578	13.7	5.5	27,600	7,220	17.6	7.3	31,600
Educational institutions	12,160	71.7	9.4	17,100	18,773	68.3	11.5	20,000	21,894	65.7	12.6	22,300	25,789	63.0	13.8	25,700
4-year coll./univ.	11,128	65.6	8.9	17,100	17,144	62.3	11.0	20,000	20,073	60.2	12.0	22,200	23,695	57.9	1.2	25,600
2-year college	549	3.2	18.5	17,000	927	3.4	20.0	19,700	898	2.7	19.9	23,800	1,044	2.5	20.7	27,100
Elem./sec. school	483	2.8	31.3	19,900	702	2.6	34.8	21,000	923	2.8	37.0	24,300	1,050	2.6	38.0	26,400
Hospital/clinic	967	5.7	21.3	17,500	1,958	7.1	22.8	21,000	1,928	5.8	19.9	22,800	2,213	5.4	22.4	26,700
Nonprofit organization	783	4.6	9.8	17,900	1,445	5.3	14.2	21,100	1,857	5.6	14.8	23,200	2,118	5.2	16.8	28,500
Federal Government	971	5.7	5.3	22,100	1,273	4.6	6.0	26,600	1,621	4.9	6.8	28,000	1,996	4.9	8.0	33,500
Military/Comm. Corps	19	.1	1.0	(1)	47	.2	2.1	(1)	52	.2	2.3	(1)	97	.2	4.7	(2)
State government	386	2.3	12.9	19,000	495	1.8	13.1	19,500	772	2.3	18.5	20,400	863	2.1	19.4	24,700
Other government	188	1.1	15.0	17,300	345	1.3	22.3	21,700	397	1.2	20.4	24,200	487	1.2	23.5	25,600
Other	74	.4	22.4	19,700	23	.1	3.9	(1)	51	.2	5.4	(1)	68	.2	6.9	(2)
No report	47	.3	16.4	18,500	184	.7	13.6	(1)	193	.6	13.8	(1)	91	.2	14.8	(2)
Primary work activity:																
Research and development	5,358	31.6	5.5	17,900	8,828	32.1	7.1	21,700	11,408	34.2	8.0	24,100	13,812	33.7	9.0	28,000
Basic research	3,500	20.6	10.2	16,800	5,434	19.8	12.5	20,600	6,404	19.2	13.4	22,200	7,991	19.5	14.5	26,400
Applied research	1,004	5.9	3.5	19,100	1,755	6.4	4.8	22,200	2,427	7.3	6.6	25,000	3,515	8.6	7.6	29,800
Development	150	.9	1.8	17,200	405	1.5	3.0	20,500	542	1.6	3.6	24,300	784	1.9	4.3	29,800
R&D management[3]	704	4.2	2.7	23,200	1.234	4.5	4.0	26,300	2,035	6.1	4.7	27,800	1,522	3.7	4.7	36,000
Management or administration	1,133	6.7	5.7	20,600	2,204	8.0	7.4	25,100	3,056	9.2	10.5	25,400	3,479	8.5	12.6	30,700
Teaching	7,504	44.3	9.4	17,000	10,396	37.8	11.5	19,500	11,415	34.2	12.4	21,800	13,919	34.0	13.3	25,300
Consulting	333	2.0	8.2	18,300	495	1.8	8.1	22,300	606	1.8	6.7	25,100	1,072	2.6	8.9	28,900
Sales/professional services	1,647	9.7	20.4	18,200	3,222	11.7	21.2	21,200	4,378	13.1	20.8	24,500	5,817	14.2	22.6	26,600
Other	641	3.8	9.2	(2)	1,652	6.0	12.9	(2)	1,788	5.4	11.4	22,600	2,253	5.5	13.7	26,200
No report	342	2.0	9.3	17,600	705	2.6	12.1	20,300	692	2.1	16.6	23,200	590	1.4	14.9	26,600

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[1] No median computed for groups with fewer than 20 individuals reporting salary.

[2] Data not available.

[3] The classification of management or administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

NOTE: Percents may not add to 100 because of rounding. Median salary computed for full-time employed civilians only.

SOURCE: National Science Foundation

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Table 79. Doctoral scientists and engineers by field and race: 1981

Field	White	Black	Asian	Native American
Total, all fields	322,900	4,600	27,900	2,300
Physical scientists	59,700	600	5,800	300
Mathematical scientists	14,500	200	1,200	100
Computer specialists	7,900	(1)	900	(1)
Environmental scientists	15,500	(1)	700	100
Engineers	47,700	300	9,100	400
Life scientists	84,300	1,200	6,400	600
Psychologists	42,700	900	600	500
Social scientists	50,500	1,400	3,100	400

[1] Too few cases to estimate.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 80. Doctoral scientists and engineers by type of employer, primary work activity, and race: 1981

Employer and work activity	White	Black	Asian	Native American
Type of employer:				
Total	304,400	4,300	26,900	2,200
Business and Industry	84,700	600	11,800	600
Educational Institutions	167,100	2,900	12,000	1,200
Federal Government	23,000	300	1,300	200
Other[1]	29,600	600	1,800	200
Primary work activity:				
Total	304,400	4,300	26,900	2,200
Research and development	102,800	900	13,900	600
Management[2]	55,000	1,000	3,300	300
Teaching	94,100	1,700	6,200	500
Other[3]	52,500	700	3,500	800

[1] Includes hospitals/clinics, nonprofit organizations, military, State and other government, other and no report.

[2] Includes management of research and development.

[3] Includes consulting, sales/professional services, other, and no report.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 81. Selected characteristics of Hispanic doctoral scientists and engineers: 1981

Characteristics	Number
Total, all fields	5,000
Physical scientists	900
Mathematical scientists	300
Computer specialists	100
Environmental scientists	100
Engineers	700
Life scientists	1,300
Psychologists	700
Social scientists	900
Type of employer:	4,800
Business and Industry	1,200
Educational Institutions	2,500
Federal Government	400
Other[1]	700
Primary work activity	4,800
Research and development	1,800
Management[2]	800
Teaching	1,200
Other[3]	1,000

[1] Includes hospital/clinics, nonprofit organizations, military, State and other government, other and no report.

[2] Includes management of R&D.

[3] Includes consulting, sales/professional services, other and no report.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

Table 82. Bachelor's and first-professional degrees awarded by field: 1960-81

Year	All fields	Science and engineering fields						All other fields[4]
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1960	394,889	120,937	16,057	37,808	11,437	24,141	31,494	273,952
1961	401,784	121,660	15,500	35,866	13,127	23,900	33,267	280,124
1962	420,485	127,469	15,894	34,735	14,610	25,200	37,030	293,016
1963	450,592	135,964	16,278	33,458	16,128	27,801	42,308	314,628
1964	502,104	153,361	17,527	35,226	18,677	31,611	50,320	348,743
1965	538,930	164,936	17,916	36,795	19,668	34,842	55,715	373,994
1966	555,613	173,471	17,186	35,815	20,182	36,964	63,424	382,142
1967	594,862	187,849	17,794	36,188	21,530	39,408	72,929	407,013
1968	671,591	212,174	19,442	37,614	24,084	43,260	87,774	459,417
1969	769,683	244,519	21,591	41,553	28,263	48,713	104,399	525,164
1970	833,322	264,122	21,551	44,772	29,109	52,129	116,561	569,200
1971	884,386	271,176	21,549	45,387	27,306	51,461	125,473	613,210
1972	937,884	281,228	20,887	46,003	27,250	51,484	133,604	656,656
1973	980,707	295,391	20,809	46,989	27,528	59,486	140,579	685,316
1974	1,008,654	305,062	21,287	43,530	26,570	68,226	145,449	703,592
1975	987,922	294,920	20,896	40,065	23,385	72,710	137,864	693,002
1976	997,504	292,174	21,559	39,114	21,749	77,301	132,451	705,330
1977	993,008	288,543	22,618	41,581	20,729	78,472	125,143	704,465
1978	997,165	288,167	23,175	47,411	19,925	77,138	120,518	708,998
1979	1,000,562	288,625	23,363	53,720	20,670	75,085	115,787	711,937
1980	1,010,777	291,983	23,661	59,240	22,686	71,617	114,779	718,794
1981	946,877	294,867	24,175	64,066	26,406	68,086	112,133	652,010
	As a percent of fields							
1960	100	31	4	10	3	6	8	69
1961	100	30	4	9	3	6	8	70
1962	100	30	4	8	4	6	9	70
1963	100	30	4	7	4	6	9	70
1964	100	31	4	7	4	6	10	69
1965	100	31	3	7	4	7	10	69
1966	100	31	3	6	4	7	11	69
1967	100	32	3	6	4	7	12	68
1968	100	32	3	6	4	6	13	68
1969	100	32	3	5	4	6	14	68
1970	100	32	3	5	4	6	14	68
1971	100	31	2	5	3	6	14	69
1972	100	30	2	5	3	6	14	70
1973	100	30	2	5	3	6	14	70
1974	100	30	2	4	3	7	14	70
1975	100	30	2	4	2	7	14	70
1976	100	29	2	4	2	8	13	71
1977	100	29	2	4	2	8	13	71
1978	100	29	2	5	2	8	12	71
1979	100	29	2	5	2	8	12	71
1980	100	29	2	6	2	7	11	71
1981	100	31	3	7	3	7	12	69

[1] Including environmental sciences.

[2] Including statistics and computer specialties.

[3] Excluding history and including psychology.

[4] Including first-professional degrees such as M.D., D.D.S., D.V.M., and J. D. degrees.

NOTE: Percent may not add to 100 because of rounding.

SOURCES: National Science Foundation, *Science and Engineering Degrees: 1950-80* (NSF 82-307) and unpublished data

Table 83. Master's degrees awarded by field: 1960-81

Year	All fields	Science and engineering fields						
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	All other fields
	Number							
1960	74,497	20,012	3,387	7,159	1,765	3,751	3,950	54,485
1961	78,269	22,786	3,799	8,178	2,238	4,085	4,486	55,483
1962	84,889	25,146	3,929	8,909	2,680	4,672	4,956	59,743
1963	91,418	27,367	4,132	9,635	3,323	4,718	5,559	64,051
1964	101,122	30,271	4,567	10,827	3,633	5,357	5,917	70,851
1965	112,195	33,835	4,918	12,056	4,294	5,978	6,589	78,360
1966	140,772	38,083	4,992	13,678	5,610	6,666	7,737	102,689
1967	157,892	41,800	5,412	13,885	5,733	7,465	9,305	116,092
1968	177,150	45,425	5,508	15,188	6,081	8,315	10,333	131,725
1969	194,414	48,425	5,911	15,243	6,735	8,809	11,727	145,989
1970	209,387	49,318	5,948	15,597	7,107	8,590	12,076	160,069
1971	231,486	50,624	6,386	16,347	6,789	8,320	12,782	180,862
1972	252,774	53,567	6,307	16,802	7,186	8,914	14,358	199,207
1973	264,525	54,234	6,274	16,758	7,146	9,080	14,976	210,291
1974	278,259	54,175	6,087	15,393	7,116	9,605	15,974	224,084
1975	293,651	53,852	5,830	15,434	6,637	9,618	16,333	239,799
1976	313,001	54,747	5,485	16,170	6,466	9,823	16,803	258,254
1977	318,241	56,731	5,345	16,889	6,496	10,707	17,294	261,510
1978	312,816	56,237	5,576	17,105	6,421	10,711	16,514	256,579
1979	302,075	54,456	5,464	16,193	6,101	10,719	15,979	247,619
1980	299,095	54,391	5,233	16,846	6,515	10,278	15,519	244,704
1981	296,798	54,811	5,300	17,373	6,787	9,731	15,620	241,984
	As a percent of all fields							
1960	100	27	5	10	2	5	5	73
1961	100	29	5	10	3	5	6	71
1962	100	30	5	11	3	6	6	70
1963	100	30	5	11	4	5	6	70
1964	100	30	5	11	4	5	6	70
1965	100	30	4	11	4	5	6	70
1966	100	27	4	10	4	5	6	73
1967	100	26	3	9	4	5	6	74
1968	100	26	3	9	3	5	6	74
1969	100	25	3	8	4	5	6	75
1970	100	24	3	7	3	4	6	76
1971	100	22	3	7	3	4	6	78
1972	100	21	3	7	3	4	6	79
1973	100	21	2	6	3	3	6	79
1974	100	19	2	6	3	3	6	81
1975	100	18	2	5	2	3	6	82
1976	100	17	2	5	2	3	5	83
1977	100	18	2	5	2	3	5	82
1978	100	18	2	5	2	3	5	82
1979	100	18	2	5	2	4	5	82
1980	100	18	2	6	2	3	5	82
1981	100	18	2	6	2	3	5	82

[1] Including environmental sciences.

[2] Including statistics and computer specialties.

[3] Excluding history and including psychology.

NOTE: Percents may not add to 100 because of rounding.

SOURCE: National Science Foundation, *Science and Engineering Degrees: 1950-80* (NSF 82-307) and unpublished data.

Table 84. Doctoral degrees awarded by field: 1960-81

Year	All fields	Science and engineering fields						All other fields
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1960	9,735	6,263	1,861	794	291	1,660	1,657	3,470
1961	10,413	6,727	1,993	940	332	1,682	1,774	3,692
1962	11,500	7,438	2,097	1,216	388	1,867	1,870	4,062
1963	12,729	8,220	2,428	1,357	483	1,976	1,976	4,509
1964	14,325	9,224	2,527	1,664	588	2,219	2,226	5,181
1965	16,340	10,476	2,865	2,074	685	2,539	2,313	5,864
1966	17,949	11,458	3,059	2,301	769	2,711	2,618	6,491
1967	20,403	12,982	3,503	2,604	830	2,966	3,079	7,421
1968	22,936	14,448	3,681	2,855	971	3,511	3,430	8,488
1969	25,743	16,039	3,935	3,265	1,070	3,815	3,954	9,704
1970	29,498	17,743	4,403	3,434	1,225	4,165	4,516	11,705
1971	31,867	18,948	4,501	3,498	1,238	4,556	5,155	12,919
1972	33,044	19,009	4,257	3,503	1,281	4,454	5,514	14,035
1973	33,756	19,001	4,078	3,364	1,233	4,503	5,823	14,755
1974	33,047	18,313	3,765	3,147	1,211	4,304	5,886	14,034
1975	32,951	18,358	3,710	3,002	1,147	4,402	6,097	14,593
1976	32,946	17,864	3,506	2,834	1,003	4,361	6,110	15,082
1977	31,718	17,418	3,415	2,643	964	4,266	6,130	14,300
1978	30,873	17,048	3,234	2,623	959	4,369	6,063	13,823
1979	31,235	17,245	3,320	2,490	979	4,501	5,955	13,996
1980	31,016	17,199	3,149	2,479	962	4,716	5,893	13,717
1981	31,319	17,623	3,208	2,528	960	4,783	6,144	13,696
	As a percent of fields							
1960	100	64	19	8	3	17	17	36
1961	100	65	19	9	3	16	18	35
1962	100	65	18	11	3	16	16	35
1963	100	65	19	11	4	16	16	35
1964	100	64	18	12	4	15	16	36
1965	100	64	18	13	4	16	14	36
1966	100	64	17	13	4	15	15	36
1967	100	64	17	13	4	15	15	36
1968	100	63	16	12	4	15	15	37
1969	100	62	15	13	4	15	15	38
1970	100	60	15	12	4	14	15	40
1971	100	59	14	11	4	14	16	41
1972	100	58	13	11	4	13	17	42
1973	100	56	12	10	4	13	17	44
1974	100	55	11	10	4	13	18	45
1975	100	56	11	9	3	13	19	44
1976	100	54	11	9	3	13	19	46
1977	100	55	11	8	3	13	19	45
1978	100	55	10	8	3	14	20	45
1979	100	55	11	8	3	14	19	45
1980	100	55	10	8	3	15	19	45
1981	100	56	10	8	3	15	20	44

[1] Includes environmental sciences.

[2] Includes computer specialties.

[3] Includes psychology.

[4] Excludes first-professional degrees such as M.D., D.D.S., D.V.M., and J.D.

SOURCES: National Academy of Sciences and National Science Foundation, unpublished data.

Table 85. Employed 1978-79 science/engineering graduates by field, level of degree, and field of employment in 1980

Field of degree	Total employed	Field of employment[1]										
		Chemistry	Physics/astronomy	Other physical sciences	Mathematical sciences	Computer specialties	Environmental sciences	Engineering	Life sciences	Psychology	Social sciences	Non-science/engineering
	Bachelor's degrees											
Total	429,100	11,300	1,800	1,700	3,600	32,800	6,400	106,000	41,100	8,500	13,200	202,500
Chemistry	11,600	6,100	—	200	—	600	100	1,200	900	—	100	2,400
Physics/astronomy	4,000	—	1,200	100	100	400	—	1,400	—	—	—	700
Other physical sciences	2,500	100	—	500	200	—	—	500	100	—	—	1,000
Mathematical sciences	18,900	—	—	—	2,200	7,100	100	1,800	200	—	—	7,200
Computer specialties	14,800	—	—	—	—	13,400	—	300	100	—	100	900
Environmental sciences	14,100	200	—	100	(2)	700	4,900	1,300	800	—	100	5,800
Engineering	107,200	100	100	(2)	200	4,000	300	94,300	500	—	—	7,800
Life sciences	92,400	4,700	400	700	(2)	2,300	700	2,400	36,200	300	800	43,800
Psychology	63,200	—	—	—	300	1,500	—	300	200	7,900	1,100	51,800
Social sciences	100,500	100	—	—	400	2,700	200	2,300	2,100	300	11,000	81,000
	Master's degrees											
Total	81,600	2,100	900	300	2,100	8,400	3,600	26,800	11,000	6,900	4,400	15,000
Chemistry	2,400	1,800	—	—	—	—	100	100	100	—	—	200
Physics/astronomy	1,300	—	400	100	(2)	200	—	400	—	—	—	100
Other physical sciences	600	—	(2)	100	—	—	100	—	—	—	—	300
Mathematical sciences	5,000	(2)	—	—	1,700	1,400	—	500	(2)	—	—	1,300
Computer specialties	5,500	—	—	—	—	4,500	—	500	—	(2)	—	400
Environmental sciences	4,100	(2)	—	100	—	100	2,900	200	100	—	(2)	500
Engineering	28,100	(2)	200	—	200	1,600	100	24,400	(2)	—	100	1,400
Life sciences	14,800	200	(2)	100	(2)	100	300	200	15,000	100	200	3,100
Psychology	10,400	—	(2)	—	100	200	—	(2)	100	6,700	—	3,200
Social sciences	9,600	—	200	—	100	300	100	200	—	100	4,100	4,400

[1] Does not include full-time graduate students.

[2] Less than 50 cases.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, unpublished data.

Table 86. Scholastic Aptitude Test (SAT) score averages for college-bound seniors by sex: 1970-82

Year	Verbal			Mathematical		
	Total	Male	Female	Total	Male	Female
1970	460	459	461	488	509	465
1971	455	454	457	488	507	466
1972	453	454	452	484	505	461
1973	445	446	443	481	502	460
1974	444	447	442	480	501	459
1975	434	437	431	472	495	449
1976	431	433	430	472	497	446
1977	429	431	427	470	497	445
1978	429	433	425	468	494	444
1979	427	431	423	467	493	443
1980	424	428	420	466	491	443
1981	424	430	418	466	492	443
1982	426	431	421	467	493	443

SOURCE: Admissions Testing Program of the College Board, *College-Bound Seniors* (annual series).

Table 87. Cumulative percentage of 1980 high school seniors taking varying amounts of science and mathematics coursework by curriculum

Number of years	Total		Academic		General		Vocational	
	Math	Science	Math	Science	Math	Science	Math	Science
Total	100	100	100	100	100	100	100	100
1 or more years	93	90	98	96	90	88	89	83
2 or more years	67	53	86	74	57	44	52	35
3 or more years	34	23	55	41	22	13	19	9

SOURCE: National Center for Education Statistics, *High School and Beyond: A National Longitudinal Study for the 1980s*, (Washington, D.C., 1981), p. 5.

related publications—continued

Detailed Statistical Tables

	NSF No.	Price
R&D Funds		
Academic Science/Engineering: R&D Funds, Fiscal Year 1982	84-308	-----
Research and Development in Industry, 1981. Funds, 1981; Scientists and Engineers, January 1982	83-325	-----
Federal Funds for Research and Development, Fiscal Years 1982, 1983, and 1984, Volume XXXII	83-319	-----
S/E Personnel		
Characteristics of Recent Science/Engineering Graduates: 1982	84-318	-----
Academic Science/Engineering: Scientists and Engineers, January 1983	84-309	-----
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Science and Engineering Doctorates: 1960-82	83-328	-----
Scientists, Engineers, and Technicians in Manufacturing and Nonmanufacturing Industries: 1980-81	83-324	-----
Characteristics of Doctoral Scientists and Engineers in the United States: 1981	82-332	-----
U.S. Scientists and Engineers: 1980	82-314	-----

Reports

	NSF No.	Price
R&D Funds		
Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1982	84-315	In press
Federal Funds for Research and Development, Fiscal Years 1981, 1982, and 1983, Volume XXXI	83-320	$2.50
Trends to 1982 in Industrial Basic Research	83-302	$3.50
Federal R&D Funding for Energy: Fiscal Years 1971-83	83-301	-----
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Science and Engineering Degrees: 1950-80. A Source Book	82-307	$5.00
Activities of Science and Engineering Faculty in Universities and 4-Year Colleges: 1978/79	81-323	-----
Young and Senior Science and Engineering Faculty: 1980	81-319	-----
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Science and Engineering Employment: 1970-80	81-310	$2.75
Composite		
Academic Science/Engineering: 1972-83. R&D Funds, Scientists and Engineers, Graduate Enrollment and Support	84-322	In press
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